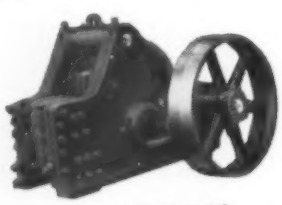
OCTOBER 1947

ROCK PRODUCTS

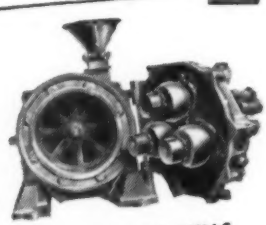
STURTEVANT
Rotary Fine Crushers
Provide Granular Products Without Excessive Dust

These fast, highly efficient crushers are designed to crush or granulate soft and moderately hard substances to fine even sizes without large amount of dust. They effectively handle materials up to and including the hardness of the softer limestone or cement clinker. The fineness of product is regulated by a hand-wheel. They produce a dependable quality of output from one inch to a quarter inch. Capacity ranges are available from one to 30 tons per hour depending on size of machine. Open door accessibility allows entire crushing area to be exposed for quick, easy cleaning. Write for information.



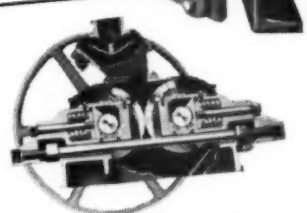
JAW CRUSHERS

for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.



RING-ROLL MILLS

for medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. No scrapers, plows, pushers, or shields.



CRUSHING ROLLS

for granulation, coarse or fine, hard or soft materials. Precision and automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8x5 to 38x20. Roller or Plain bearings. The standard for abrasives.

STURTEVANT MILL COMPANY

How water climbs a ladder

A typical example of B.F.Goodrich product improvement

AT SOME fires the water has to go high. Firemen have to draw hose up narrow ladders. And they have to do it in seconds.

Fire hose used to be heavy, bulky; it took too much strength and time to lift and carry; it wasted those precious seconds that often determine whether or not lives and property can be saved.

B.F.Goodrich, with more experience in fire hose design and making than any other company, set out to improve this old, standard product and came up with something almost completely new: a new way of twisting the cords to make them stronger; a new rubber compound that is lighter yet stronger, and lasts longer as well; a new way of weaving the cotton jacket that gives greater strength with smaller cords, and no weak spots; in fact, a new fire hose that is 18% lighter yet stronger than ever before; a hose that gets into action faster.

Just for good measure, they developed a new *Koroseal* gasket that can be tightened by hand — cuts coupling time in half, a new and stronger end construction near the coupling where failures used to be common, and a new treatment to prevent mildew.

This often happens at B.F.Goodrich when engineers set out to improve a "standard" product. That's why it pays to ask your distributor what new developments in rubber B.F.Goodrich has made lately in any products you may buy. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

Koroseal—Trade Mark Reg. U. S. Pat. Off.

B.F.Goodrich

FIRST IN RUBBER

OCTOBER, 1947

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY

VOL. 50, No. 10

This Month

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"WE HEAR..."

October, 1947

Construction activity, as measured by the value of work put in place, rose ten per cent from May to June, according to estimates of the Bureau of Labor Statistics.

* * * * * * * * * * *

F. W. Dodge Corp. has reported that the total of all construction contracts in the 37 states east of the Rocky Mountains awarded during the first seven months of 1947 was $4,152,899,000, reflecting a decline of 11 per cent from the comparative total for 1946. A 21 per cent drop in non-residential building and a ten per cent decline in residential contracts were cushioned by a nine per cent increase in heavy engineering works.

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Progressive Citizens of America, formerly the Political Action Committee, is advocating government ownership of the railroads, power and coal operations.

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The Senate passed Bill S. 418 providing for the prevention and control of water pollution by the federal government, and the House likely will act on the proposed law at the next session of Congress. The bill enables the government to intercede and stop pollution which is injurious to public health and where States have not solved the problem themselves.

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Cost of living, based on retail prices, was 157 per cent over 1939 as of the middle of June and is probably still higher now.

* * * * * * * * * * *

"Soapless" soaps reportedly have been used experimentally in laying flammable and health-impairing coal dust in one of the largest mines. It is said that dry cutting of coal raises the dust up to concentrations of 300 million to 400 million particles per cu. ft. of air, and that soapless soap made from detergents when mixed with a water spray reduces the dust concentration to ten million particles.

* * * * * * * * * * *

A veteran's re-employment rights are not always satisfied by an employer offering him his old job at his former pay. A court has ruled that when the position involved has become more responsible and carries a higher rate of pay, the veteran is entitled to that increase.

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According to a recent court ruling, an employer cannot grant top seniority to union officials in disregard of seniority rights of war veterans during their first re-employment year.

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Producers of Indiana building limestone (dimensional) are featuring a split stone which is a product that is available in four or five different sized pieces. Each piece is a multiple of brick sizes and is the same thickness as brick, but sells for 40 cents a square foot f.o.b. plant. Quarrying in the Bedford area is at a rate unequalled since pre-depression days.

* * * * * * * * * * *

WE HEAR

Meadowbrook Apartments in Indianapolis, comprising 640 new dwelling units and financed with an FHA-insured mortgage, is the largest single project yet started under the new FHA program providing rental housing for World War II veterans.

* * * * * * * * * * *

Producers of rock products and concrete products have prosperous potential customers in farmers. According to the Department of Agriculture, farmers are better heeled now than ever before in history. Assets of agriculture are better than $100 billion, four times as large as at the beginning of the war, and the nation's "poor relations" have good incomes, money in the bank, few debts and land and buildings with double their value ten years ago.

* * * * * * * * * * *

Pennsylvania's famed Turnpike is to be extended eastward from Middlesex to a point east of Pavli, to provide additional miles of 4-lane, low-grade road between Pittsburgh and Philadelphia. Construction, to start in 1948, is to be financed by private capital through a bond issue.

* * * * * * * * * * *

The fact that employes are satisfied with their labor contract does not mean that an employer can disregard the overtime requirements of the Fair Labor Standards Act. It has been ruled that employes, even if they want to, cannot waive their overtime rights, public interest taking precedence over private interest.

* * * * * * * * * * *

Due to a shortage, rental charge for freight cars for use has been raised to $2 a day effective October 1. The old rate was $1.25 per car per day. Effect of the increase will be quicker return of cars rented from other roads and shortening of handling delays.

* * * * * * * * * * *

Output of building materials is increasing. According to the Commerce Department, production in the first half of 1947 was 19.1 per cent above the same period in 1946, which is 37 per cent higher than in 1939. Shortages of most materials, with the notable exception of sheet steel, will soon disappear.

* * * * * * * * * * *

Civil Aeronautics Administration has made changes in the federal-aid airport program whereby only 908 airports are to be built or improved in the year ending June 30. Estimated cost to the federal government is $66,570,000 and local sponsors will furnish $70,235,000. CAA has a backlog of requests for airport work totalling $250,000,000 in federal aid.

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The Chemical Engineering Department of the University of Texas reportedly is actively engaged in research on lime manufacture. Most of the work thusfar has been devoted to lime burning, the object being to develop a flash burning process for lime calcination.

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One of every 17 disabled veterans in schools and on-the-job training courses under the Vocational Rehabilitation Act is learning a skill or trade in the construction field. A total of 13,400 construction trainees of 229,000 handicapped veterans was enrolled as of May 1.

* * * * * * * * * * *

With 1399 miles of highway projects placed under contract during the first five months of 1947, Kentucky ranks fourth among all States in its road program. Only Texas, Ohio and Virginia outranked Kentucky in road mileage placed under contract for that period.

THE EDITORS

★ ★ Editor's Page

Costs and the Changing Status of Home Building

It is truly remarkable the turnabout in home building activity that is taking place. Early in 1947, the rate of building new homes had slumped well under anticipated levels and the pessimists began to cry that a recession, even a depression, was threatening or developing. The buying public was on a buyers' strike that could only end in severe economic collapse if of prolonged duration, they believed, or, just as disastrous, people were not able to pay the current high costs of building.

Now, just a few months later, we have a home building spurt representing the highest rate of activity in twenty years. Removal of rent ceilings has been a factor but the real reason for the boom is that propaganda put out the past several years, that prospective builders of homes hold up and wait for substantial reductions in costs that would assuredly accompany a sustained buyers' strike, has lost its effectiveness. People are finding out that they cannot enjoy postwar wages and income and still buy at prewar levels.

That home building costs are too high leaves no room for argument but, if history repeats itself, the markup in building costs today is roughly in line with increases that prevailed shortly after World War I, percentagewise, and the peak in costs probably has been reached.

Prospects for Cost Reduction

Moderately lowered building costs will come as abnormalities are corrected, and will stabilize at levels determined by the degree to which material costs may be reduced, the efficiency of building operations, productivity of skilled labor, and diminishing strikes. Only slight reductions in material costs are foreseeable in the early future, for the production of most materials encompasses pyramided items of inflated cost, including labor, throughout their manufacture. A possible ten per cent reduction here would mean a decrease of approximately four per cent in the total cost of a home.

It is impossible to foresee opportunity for reduced labor rates in the near future. Wage increases still are being granted, and the adoption of pay for holidays and employe benefits of many kinds are considerable labor cost items.

The only avenue for immediate relief from high labor costs seems to be through universal standardization of the forty-hour week and the elimination of multiple-pay work, an accomplishment that will demand cooperative action of the workers, contractors and particularly, the buyers, who should under no circumstances force jobs into overtime in the interests of speed. Where the forty-hour week has already been established, economies in labor of 15 to 25 per cent are being cited, which would amount to another saving of some eight per cent in overall cost of building. Savings result from reductions in wages paid but, more important, from improved productivity.

Maladjustment in Purchasing Power

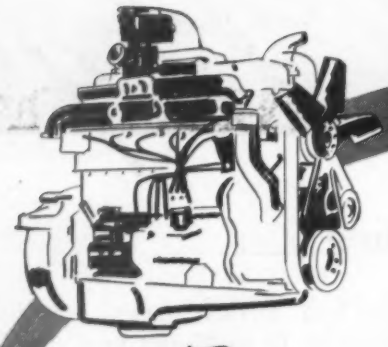
Building cost increases range anywhere from 50 per cent to 100 per cent over 1939 figures, plus added expenses due to shortages of materials and inefficiencies, both of which are capable of improvement. High output of work per unit of time is extremely important, and it is untenable that there has been a failure to expand unit output of work at a time when building tradesmen are receiving the highest wages in history. Productivity of skilled building labor is something like two-thirds of what it was in 1939. This factor, along with the wage increases quoted, fixes the main responsibility for excessive costs. Reasonable improvement here, whether it be accomplished through apprenticeship training or because competition for jobs develops, could well contribute to an overall saving of some 20 per cent in building costs, which would uncover prospective owners of new homes who thus far have not indicated they are in the market. To force prices lower, through prolonged resistance to high costs, could lead to depression or at least a mild recession in volume, which some believe would have a salutary effect on costs much preferable to the alternative of a boom and bust condition.

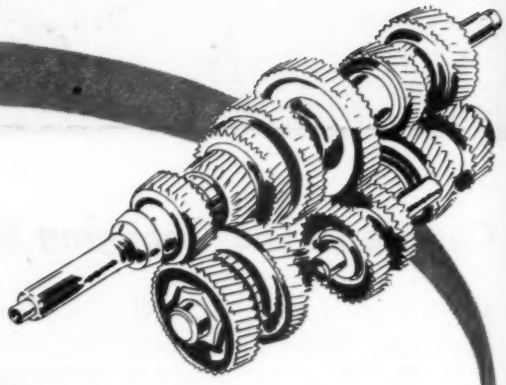
Cost of living data have been put out in recent months to counteract resistance to purchasing that has emanated from encouragement given the public that a big drop in costs would follow in the wake of a sit-and-wait policy. Figures are being publicized to prove that home building costs have increased less than other costs and to point out that the present time is more favorable for building than in the 1935-1939 period, because individual incomes have increased more than 100 per cent.

That may be true, for the former low income group and the relatively few in the highest wage class, but the big middle class which constitutes the great normal market for new homes has not been blessed with that kind of increased income.

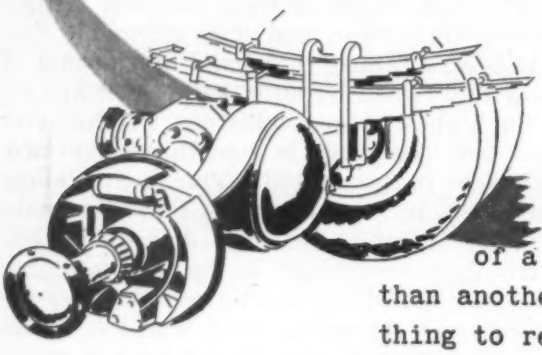
That is the class of individual who must wait for some cost reductions and upon whom the real home building boom hinges.

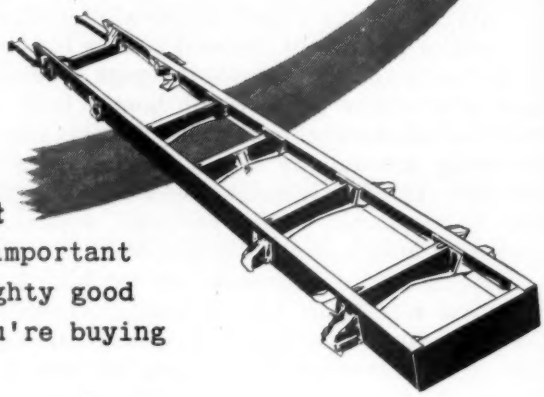
Bror Nordberg





They ALL have to work TOGETHER!





No single part of a truck is more important than another. That's a mighty good thing to remember when you're buying a truck.

It's the way you make all the parts that counts—because a complete truck is no better than its weakest component. It's the way you put them together too, because it's equally important that all parts fit properly and work together efficiently.

That's why here at Mack we maintain full control, through outright manufacture, over the materials, workmanship and testing of every part that goes into a Mack.

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6046

By NATHAN C. ROCKWOOD

Depreciation and Replacement Costs

IN THE August issue we discussed the decreasing purchasing power of the dollar and its effect on replacement of depreciated and obsolete plant assets. It appears now the suggestion that producers and manufacturers be permitted to write up their plant assets to present-day dollar values is neither new or novel. A pamphlet recently issued by the Machinery and Allied Products Institute argues quite ably the case for depreciation write-offs based on replacement rather than original cost. The Institute is interested not only in replacing obsolete and uneconomical equipment in the plants of its member companies but because its member companies would like to be able to sell more replacements to other industries, like our rock products field.

Ways of Handling Depreciation

The Institute argues that "under depreciation" by corporations alone comes to about $1,500,000,000 a year, and that income taxes paid on this sum, which, at present dollar values, should be deducted from taxable earnings, amount to some $600,000,000 a year. The argument is that in reality this is a tax on capital and not on income. This is another way of saying that corporations are being compelled to spend $1,500,000,000 more for replacements than the depreciation they have deducted from their taxable incomes during the last few years to take care of such replacements.

Another suggestion has been made for meeting this issue of the constantly decreasing purchasing power of the dollar. It is that the producer or manufacturer be permitted to keep on deducting the depreciation on a piece of equipment or machinery beyond the period now allowed by the Internal Revenue Division of the Treasury Department, in which it has been 100 per cent depreciated, so long as the equipment continues in use. For example, a power shovel may be depreciated in 10 years and thus be written off entirely, yet, if well taken care of, it may serve for another 10 years. Its replacement cost may be twice its original cost, and if the depreciation write-off is continued at the same rate for the next 10 years, its present replacement cost might be recovered.

During the last few years of hard service and the necessity of having to put up with unskilled and careless workers, in many instances, producers in the rock products industries have been more concerned with trying to get their depreciation percentages increased for shorter life expectancies than in lengthening the depreciation period. Accountants say that irrespective of the percentage allowance permitted by the income tax laws, the best practice is to depreciate on a realistic estimate of the anticipated life of the equipment or machinery. There is nothing to prevent the corporation or the individual keeping his own book records on that basis, and many do. We suspect that some pieces of machinery and equipment used in the rock products industry have been proved to have a longer useful life than they have been depreciated for in income tax returns. Since the purchasing power of the dollar has progressively deteriorated, this means that the producer or manufacturer who hastened to depreciate his plant assets in 1930 dollars is worse off today than the one who has been able to continue writing off with present dollars. That is to say that dollars were harder to get and worth more in the 1930's than in 1947.

Purpose of Depreciation?

From an accountant's point of view there are objections to writing up assets to present dollar values; and it must be admitted that it would be complicated, since the value of the dollar continues to fluctuate, and very likely will continue to. Therefore, any such change in bookkeeping would involve future estimates of the purchasing power of dollars, as well as guessing at the useful life of equipment that may have to be replaced. Accountants say that the purpose of depreciation is to allocate costs of present production and not of providing for replacement. That means, of course, that the only way to recoup present high replacement costs, is to increase present investment cost account, and make prices accordingly.

It is obvious that the producer who issued bonds or had other funded debts in the 1930's and is paying off in 1947 dollars, profits from the depreciated currency; but the tough part of it is that most corporations did their best to get rid of such debt before the dollar reached its present low purchasing power, and are now faced with the necessity of acquiring new indebtedness which may have to be paid off some years hence with dollars worth more than those that were borrowed. The one saving consideration is that present interest rates are probably about as low as they will ever be. However, since interest payments are deductable from income for tax purposes, this does offer an out for those who make replacements even at present costs.

Advice of Experts

Commenting editorially on this problem of depreciation and high replacement costs, the *Wall Street Journal* argues against basing depreciation costs on present reproduction values, although it admits that the idea is gaining support from industry, and that there is small doubt that there will be a vigorous effort to get Congress to make tax law revisions along that line. The *Journal* argues that there are even stronger reasons against the plan than merely technical or administrative ones. It says:

"For one thing, if the advocates of the proposal persuade Congress to alter this section of the tax law they may find they have forged a double-edged sword for government. The idea long entertained by some public utility commissions that depreciation, an important factor in rate making, should be based on cost or replacement, whichever is lower, has plagued the utility companies for several years.

"Fluctuating prices may at times benefit, at others harm business. They are, we believe, distinctly the risk of management and cannot be passed on. It cannot be too often repeated that every time business endeavors to pass on to the government risks essentially its own it invites increased governmental interference with its affairs. Sooner or later it must repay, with heavy interest, any handouts from Uncle Sam."

In view of the fact that we made the suggestion independently in our August issue, it is only fair that we give space here to the objections of experts. These expert opinions, however, do not change the main theme of our previous discussion that there is poor management of our currency somewhere in permitting such rapidly fluctuating dollar values. It is possible, of course, that the federal government, with its enormous debt to service, deliberately plans for high prices and high dollar incomes and high taxes. It is nevertheless, playing with dynamite, because it is constantly increasing its own costs in proportion. It will be easier to reduce business costs than government costs; but there is little present disposition, apparently, to reduce either.

LABOR RELATIONS TRENDS

Procedure Under New L.-M.R.A.

By NATHAN C. ROCKWOOD

ON August 23, the effective date of the Labor-Management Relations Act of 1947, the National Labor Relations Board issued a new set of rules and regulations to govern procedures in actions before the Board and its Regional Officers. All employers should become fairly familiar with these rules and regulations and the standard forms to be used. The application and implication of the Act are so broad that no employer can be sure he will not sooner or later become involved.

Like Court Procedures

The primary difference between old and new procedures rests on the fact that the N.L.R.B. and its Regional Officers are now expected to be impartial judges or referees. The Regional Officer must hear all sides of a controversy, including interested third parties, sift the evidence, make an unbiased "intermediate report" to the Board at Washington, with recommended decision. The Board is expected to review this report with the aid of its own legal advisors, to adopt it as a Board decision, or to reject it, revise it, or return it to the Regional Office for further investigation. During the entire processing of a dispute, either party, or interested third party, may object to, or recommend as final, the finding of the Regional Officer, or demand a rehearing, or a hearing before the Board itself. If the loser chooses he can appeal from the Board's own orders to the Federal Courts. The Board's orders are enforceable only through the courts.

It is well worthwhile to study these rules and regulations of the N.L.R.B. because they throw more light on interpretation of the Act than reams of previously printed discussion by "experts." It has been said that the Act created a paradise for lawyers; but there is nothing in the Act or in the regulations governing procedure which requires the employment of lawyers. Indeed, if the spirit of the rules and regulations, and of the Act itself, is carried out, every effort can and should be made to arrive at a settlement or compromise on the merits of the points at issue without resort to technical, legal entanglements; just as many employers have found it is more satisfactory to match wits with their employes face-to-face than to act through a lawyer who is unfamiliar with production and human relation problems, however well-versed he may be in the technicalities of the law.

How Charges Are Handled

Charges of violation of the L.-M.R.A., by any interested party, are filed with the Regional Office, which may supply a copy to the accused party (respondent), but it is the legal obligation of the one making the charges to supply such copies. Alleged violations of Section 8 (b) (4) (A), (B), and (C) covering strikes and boycotts are given priority over all other kinds of charges. The person filing the charges must sustain them with all the written evidence at his command and the respondent is given opportunity to reply with a written statement of his side of the controversy. The Regional Director then investigates and weighs the charges and countercharges, and determines whether or not the law has been violated. The Regional Director may recommend withdrawal of the charge, or the complainant may voluntarily withdraw the charge, if the dispute can be settled without further procedure.

If the complainant refuses to withdraw upon the recommendation of the Regional Director that the case will not hold water, the Director dismisses the charge, and sends all records relating to it, to the General Counsel of the N.L.R.B. at Washington. The General Counsel reviews the case and may either sustain the dismissal by the Regional Director, or order him to take further action. The General Counsel, under the Act, is the officer charged with the prosecution and not the Regional Officers, as before. Hence, the General Counsel is the judge of the legal merits of a case.

Before any formal action is taken, the parties to the dispute are given ample opportunity for submission and consideration of facts, arguments, offers of settlement or proposals of adjustment, except where public interest demands speedy action. Agreements, subject to the approval of the Regional Director, may be made anywhere along the line; and it is his continuing duty to see that any such agreement is lived up to. Even though formal proceedings have begun, the parties have full opportunity to call quits at any time and settle their dispute "out of court." However, all settlements made after the issuance of a complaint by the Regional Director require both his and the Board's approval. This provision is evidently designed to prevent any private deals.

Hearings—Judicial

Except in extraordinary situations, hearings are open to the public and are conducted similarly to federal court proceedings. A Trial Examiner sits as judge or referee. Counsel for the Board, all parties to the proceeding, and the Trial Examiner have the power to call, examine, and cross-examine witnesses, and to introduce evidence into the record. The General Counsel, or one of his representatives, is present to take care of the public interest in the dispute. Any of the parties may submit briefs, engage in oral argument, and submit proposed findings and conclusions to the Trial Examiner. The attendance and testimony of witnesses may be compelled by subpena.

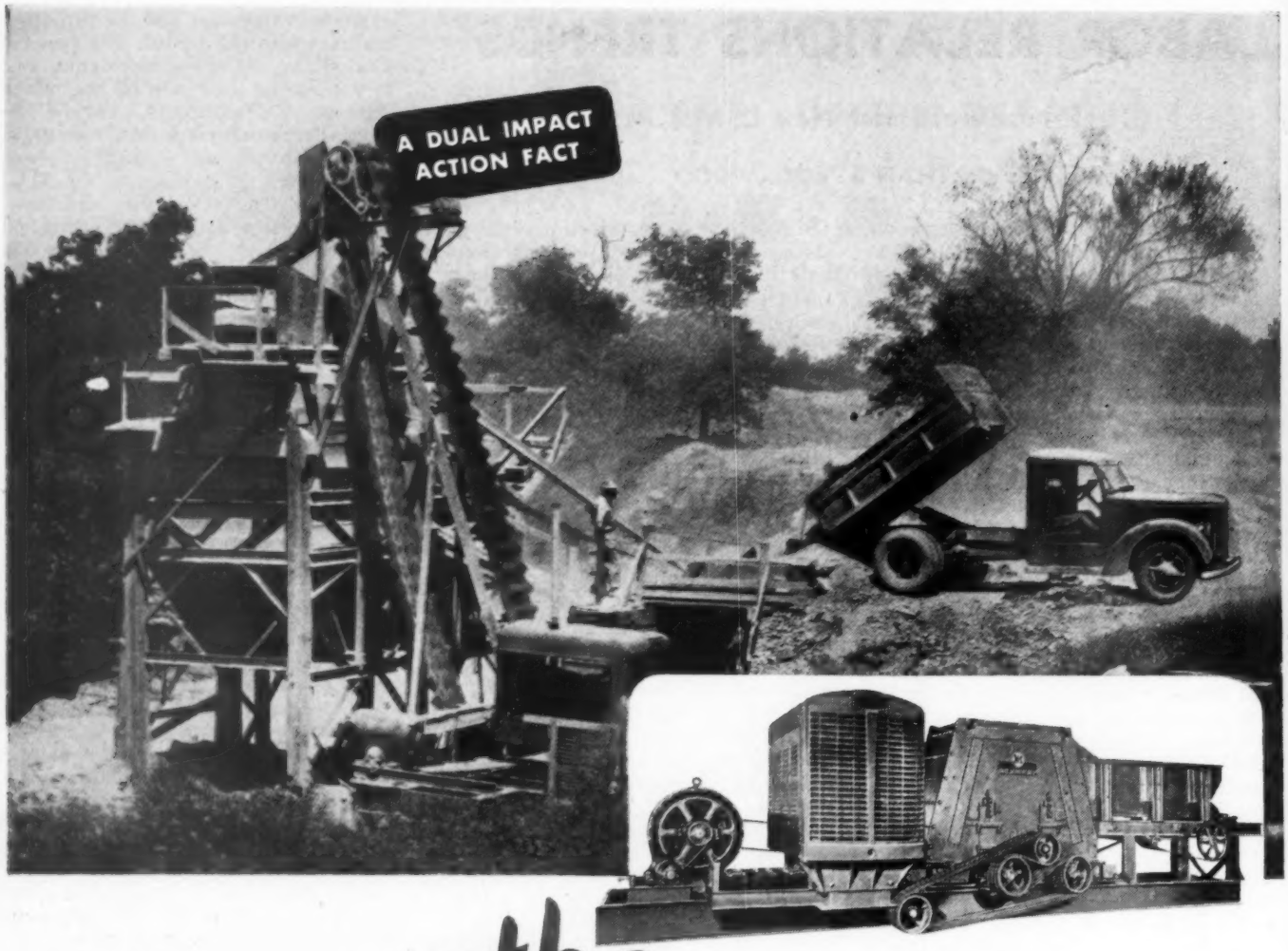
The functions of all Trial Examiners and other Board agents or employes participating in decisions are to be conducted in an impartial manner, and any such Trial Examiner, agent or employe may at any time withdraw if he deems himself disqualified because of bias or prejudice; or any party to the case may request his withdrawal for cause. The Board's attorney has the burden of proof of violations of this section of the Act (unfair labor practices). The rules of evidence are to follow as closely as possible those of the United States Courts. Incidentally, former employes of the Board are forbidden to appear in any case with which they had anything to do while serving the government.

Contemptuous conduct at any hearing before a Trial Examiner, or the Board, however, is not contempt of court. It can be punished only by excluding the guilty party from the hearing. The refusal of a witness to answer proper questions shall, in the discretion of the Trial Examiner, be ground for striking out all testimony previously given by such witness on related matters. Union officials, therefore, who contemplate ignoring the Board and its Regional Offices, or refuse to comply with the law's requirements regarding listing of officers, financial statements, communist affiliations, etc., will find their side of the case without defense, and the Board's orders might then be based entirely on the allegations of the employers and public interest parties.

Board Orders

The parties to the dispute may consent to the Intermediate Report of the Trial Examiner, which is forwarded to the Board at Washington, but if exceptions are filed, the Board acts as a supreme court over the matter and may confirm or not the Intermediate Report, and without consultation with the Trial Examiner or with any agent of the General Counsel. In other words it is to decide the issue solely on the record of evidence, the report, the exceptions there to, the exhibits, briefs and arguments. The Board's decision or order is sent to the Regional Office which has the job of obtaining compliance and reporting back to the Board, which has the final say as to whether or not the agreement to comply is satisfactory. When necessary, the Board has the power to implement its order with a U. S. Court decree, and noncompliance then becomes contempt of court and punishable as such. It still remains the duty

(Continued on page 136)



10 months PRODUCTION . . .
ONLY ONE REPLACEMENT

on a job that formerly required new hammers twice a day

Impeller bars on this New Holland Double Impeller Breaker were changed only once in 10 months of the hardest kind of crushing . . . primary and secondary in one operation. On the mill previously used, for secondary crushing only, hammers had to be changed twice each day. That's why Walter W. Roop, owner of Roop Quarries, Warrensburg, Mo. says, "The New Holland 3030 Breaker is economical to operate.

"We crushed 50,000 tons of rock from May 1, 1946 to December 1, 1946.

"We are crushing 100 tons per hour . . . 100% will pass 1½" mesh, 60% through 1" mesh, 40% through ½" mesh and 25% through ⅛" mesh.

"I would say that if we were buying more units they would be 3030 Breakers."

Here is an experience *you* can profit by! Write today for complete information and specifications on this up-to-the-minute Breaker.

NEW HOLLAND MANUFACTURING COMPANY
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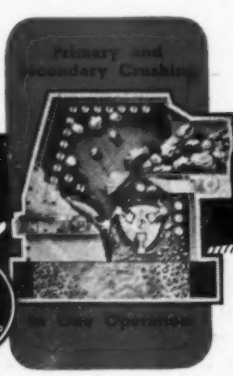
See the 3030 Breaker in Action!

Ask your nearest New Holland distributor to show you "The New Stone Age", a sound and color film on this revolutionary new Breaker.

NEW HOLLAND DOUBLE IMPELLER *Breakers*



the *Personal Side* of the news

Elected Vice-President

WILLIAM E. CLARK, general manager of the Keystone division of the Dravo Corp., Pittsburgh, Penn., has

William E. Clark

been elected a vice-president of the corporation. Mr. Clark was formerly associated with the Lehigh Portland Cement Co. as manager of the Pittsburgh office. He later was appointed assistant to the manager of the Keystone Sand and Supply Co., one of the pioneer Dravo companies. In 1937 he became president of Miller and Coulson Co., wholesale construction materials firm, later acquiring control of the company and operating it as the W. E. Clark Co., which was subsequently merged with the Keystone division. A short time before the merger Mr. Clark was appointed assistant to the vice-president of the Wilmington, Del., shipyard of the Dravo Corp., and later was named administrative manager. Two years ago Mr. Clark was transferred to Pittsburgh as general manager of the Keystone division. He is also a member of the board of directors.

General Superintendent

ROBERT L. HUTCHISON has been appointed general superintendent of the Columbia Chemical Division and the Southern Alkali Corp., a subsidiary of Pittsburgh Plate Glass Co., Pittsburgh, Penn. Mr. Hutchison has served as superintendent of the chemical division's alkali producing plant at Barberton, Ohio, for the past seven years. He joined the firm in 1925 as a draftsman in the engineering department. Six years later he was placed in charge of all maintenance and construction, a position he held until his appointment as plant superintendent in 1940. Mr. Hutchison's headquarters will be at the Columbia Chemical Division offices in Pittsburgh.

E. WAYNE HALEY, assistant director of sales, Southern Alkali Corp., has been appointed director of sales of the subsidiary company, succeeding Eli Winkler who will continue with the firm as sales consultant. Mr. Haley will maintain headquarters in New York, N. Y. H. W. GLEICHERT, director of sales for the Columbia Chemical Division, will continue in that capacity, with headquarters in Pittsburgh.

Joins Brown Industries

LARS CARLSON, sales manager for the Washington Brick and Lime Co., Spokane, Wash., has joined the general sales staff of Brown Industries, Spokane, manufacturers of aluminum truck and trailer bodies. Mr. Carlson was regional field manager for the National Committee for Economic Development in Washington, Oregon, Idaho, and Utah during the war years.

Ideal Promotions

S. A. GRETENCORT, superintendent of the Three Forks Portland Cement Co. plant, Hanover, Mont., has been appointed assistant to the general manager of Ideal Cement Co., Denver, Colo. He will be succeeded as superintendent at the Hanover plant by JAMES R. GWIN, formerly chief clerk at the Portland, Colo., plant. GORDON A. STEWART, accountant in the general office at Denver, will be chief clerk at Portland, Colo.

Operates Own Quarry

ARNOLD L. ANDERSON, who has worked for years on the agricultural conservation program of the A.A.A., has resigned as vice-chairman of the Monroe County A.A.A. Committee to devote all his time to the production of agricultural limestone at his quarry near Eddyville, Iowa. Mr. Anderson is a farmer in Mantua township and his unexpired term will be completed by Patrick T. Coady, Franklin township farmer. A.A.A. county and township committees are elected by farmers for one-year terms.

On White Sox Team

SPORTS ENTHUSIASTS in the industry will be interested in knowing that one of the best known professional baseball players this season—GORDON MALTZBERGER, relief pitcher of the Chicago White Sox, has been associated with the Colton plant of the California Portland Cement Co. since 1932. He was employed at the plant for two years from 1932 to 1935, and has been working there during the winter months since that time.

Manages Seattle Plant

GORDON TONGUE, formerly secretary of the Superior Portland Cement Co., Seattle, Wash., has been appointed manager of the Seattle plant of the Pacific Coast Cement Co. which is being operated by the Permanente Cement Co. for the manufacture of cement for northwestern United States, Canada and Alaska. Limestone for the plant will be obtained from a deposit at View Cove, Alaska, the raw material to be hauled to the plant on the S.S. Diamond Cement, a vessel which is now under charter to the Permanente Cement Co. Mr. Tongue has been associated with the cement industry for 25 years.

Sales Managers

EUGENE T. BARRETT has been appointed sales manager for the Philadelphia, Penn., district of the Whitehall Cement Manufacturing Co. ERNEST F. STICKLES has been named New York district sales manager, and EDVIN J. SOLDWEDEL has been made metropolitan manager for New York.

President Engineer Society

ARTHUR HEWITT of the Warner Co., Philadelphia, Penn., has been elected president of the Central Pennsylvania chapter of the Pennsylvania Society of Professional Engineers.

Heads Division

JOHN W. DENT, formerly production manager of the Thompson-Weinman Co., Cartersville, Ga., has been appointed vice-president and general manager of the Calcium Products Division of the Georgia Marble Co.,

John W. Dent

Tate, Ga. WILLIAM B. TATE, JR., has taken over the position of sales manager of the Calcium Products Division. He was formerly connected with the engineering department of the company.

Illinois Geological Survey

DR. ARTHUR C. BEVAN, State Geologist of Virginia, Charlottesville, Va., has been appointed principal geologist on the Illinois Geological Survey, Urbana, Ill., and will have charge of the geological resources section. He succeeds Dr. Ralph E. Grim who has requested relief from administrative duties to devote more time to the Survey's research program on clay minerals. Dr. Bevan will retain his chairmanship of the Division of Geology and Geography of the National Research Council.

Asphalt Institute Elections

WALLACE D. CRAIG, Standard Oil Co. of New Jersey, has been elected vice-president of the Atlantic-Gulf division of The Asphalt Institute, New York, N. Y., He succeeds the late Joshua S. Sawyer of the Shell Oil Co., both as vice-president and member of the Institute's executive committee. Herbert Spencer, secretary and one of the founders of The Asphalt Institute, has been named district engineer for New York and New Jersey, retaining his position as secretary.

Blindness No Handicap To Quarry Operator

ELMER ARMBRUST, owner-operator of Sugar Creek Quarry, Washington Court House, Ohio, has seen the operation grow from 3 to 800 tons per day in 20 years. He has seen the addition of a ready-mixed concrete plant, a concrete block and brick plant; and is now helping to visualize plans for a large warehouse for storage of a complete line of builder's supplies which the firm will soon handle. All this has been accomplished despite the fact that Mr. Armbrust is totally blind.

Though his eyesight was failing when he started the quarry, an operation spared his sight for about a year and in this time he came to know the plant and machinery so well that today he is still able to move about the plant in almost complete freedom, even to the extent of climbing ladders. New machinery is "seen" through verbal description and touch. The eldest son now operates his own quarry, the second eldest manages the Sugar Creek Quarry, a third manages the concrete plant, while two more operate a 500- acre farm. Mr. Armbrust has the satisfaction of knowing that his family of five sons and four daughters has been well cared for, along with the 28 men and women on the company payroll.

Promoted

R. S. HAMMOND, district manager in Atlanta, Ga., for the building products division of Johns-Manville Corp., New York, N. Y., has been promoted to general sales manager of the division. In his new post, he becomes a vice-president of Johns-Manville Sales Corp., succeeding L. C. Hart, who has been promoted to vice-president for relationships.

Returns from West Indies

HERBERT H. LAUER, plant manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y., has returned from a visit to cement plants and

Herbert H. Lauer

other industrial plants in the West Indies. He visited the cement plant at San Juan, Puerto Rico, which he designed in 1936 and 1937, also the new cement plant at Ponce, the government plant at Trujillo City, Dominican Republic; and the Lone Star Cement Co. plant near Havana, Cuba. Mr. Lauer says there is a tremendously heavy demand for cement in the West Indies which the plants there are unable to supply.

Field Engineer

THOMAS L. KELLY has been appointed structural field engineer for the western New York district of the Portland Cement Association, Chicago, Ill., and will have his headquarters in Buffalo. He was formerly associated with several New York consulting engineering firms on structural design.

Chinese Visitor

PAUL H. CHANG, chief engineer for the Hwahsin Cement Co., Hankow, China, recently visited the municipal port director of Milwaukee, Wis., for the purpose of investigating shipping arrangements for the new $3,500,000 cement mill being built in Hankow, China, with Allis-Chalmers Manufacturing Co. equipment. Mr. Chang said that the two sections of the plant would have an output of 3000 bbl. of cement a day, which can be stepped up to 7500 bbl. a day.

Royalty Visits Lehigh

PRINCE SAIF AL-ISLAM ABDULLAH, the sixth son of His Majesty the Imam Yahya of Yemen, Arabia, and his party recently visited the Sandts Eddy plant of the Lehigh Portland Cement Co. for a tour of inspection. This was the first official visit of Yemeni to the United States and one of the first visits by royalty to Allentown, Penn. The prince is in this country to study America and discuss with American businessmen the prospect of developing his country. He feels that Yemen, Arabia, may possess such natural resources as gold, silver, copper, coal, vanadium and other minerals and oil. Yemen is a mountainous country, 75,000 square miles in area with a population of about four million people. It is located at the southwestern end of the Arabian peninsula, along the shores of the Red Sea. It is famous for its mocha, one of the finest coffees, and also exports hides. The official hosts were Fred Kramer, Jr., president, and Winfield Clearwater, executive vice-president of the Allentown Chamber of Commerce, and John Young, employe relations representative of the Lehigh Portland Cement Co.

Attends Talc Meeting

HENRY MULRYAN, executive vice-president of the Sierra Talc Co., Los Angeles, Calif., recently attended a special meeting of talc producers in New York, N. Y. Mr. Mulryan is a director of the Los Angeles Chamber of Commerce, and chairman of the Western Committee of the Industrial Minerals Division of the A.I.M.E.

Cement Research

TWO RESEARCH FELLOWSHIPS for studies of hydration products of portland cements, and carrying stipends of $1000 per annum and allowing one month's vacation, now are available to qualified graduate students, it has been announced by the chemistry department of the University of Toledo. Additional information may be obtained from Harold G. Oddy, head of the department, University of Toledo, Toledo 6, Ohio.

Slag Plant Rebuilt

JOHN DE SOUSA, Reiglesville, Penn., is planning to resume operation of his slag plant, which was under lease to Johns Manville during the war. Mr. de Sousa plans to install all new equipment to handle a greater tonnage. By-products will be sold as pea gravel and ballast.

OBITUARIES

JAMES F. PRINCE, president of the Acme Limestone Co., Fort Spring, W. Va., died July 30 at the age of 79. Mr. Prince was one of the pioneer businessmen of southern West Virginia. At the time of his death he was president of the New River Banking and Trust Co., Oak Hill, W. Va., and vice-president of the Bank of Raleigh, Beckley, W. Va. He was vice-president of the West Virginia Steel Corp., Charleston, W. Va., and a member of the boards of various mining and other companies. His brother Frank A. Prince, formerly vice-president of the Acme Limestone Co., was elected to the presidency of the company by the board of directors on August 14, 1947, filling the vacancy left by the death of his brother.

JOHN HENRY PRINCE, Vineland, N. J., formerly associated with the Kosmos Portland Cement Co., Inc., Kosmosdale, Ky., passed away on July 18 after a short illness. He was 84 years of age. Mr. Prince was an uncle of John W. Prince, president of the Stewart Sand and Material Co., Kansas City, Mo.

ANDREW EDWARD JOHNSON, mechanical superintendent of the Westport mill, laboratories and testing plant of The Dorr Co., New York, N. Y., died August 15, at the age of 69. Mr. Johnson had been associated with John Van Nostrand Dorr since 1903 and had taken part in many of Mr. Dorr's engineering developments.

PERCY JENKINS, hardware products sales manager for the Wickwire Spencer division of The Colorado Fuel & Iron Corp., New York, N. Y., died suddenly on August 20. He was 47 years old.

G. L. LILLARD, southern district manager of the Shovel and Crane Division of Lima Locomotive Works, Inc., Lima, Ohio, died August 20 from injuries resulting from an automobile accident on August 7 near Pine Bluff, Ark.

GORDON J. REIF, secretary-treasurer of the Ozaukee Sand and Gravel Co., Grafton, Wis., died September 1 at the age of 29. A native of Milwaukee, Mr. Reif graduated from Marquette University college of engineering in 1942. He had served as a structural engineer at the Curtiss-Wright Corp., Columbus, Ohio, for three years.

MRS. CLARA GRAF, vice-president and treasurer of the Manegold Stone Co., Milwaukee, Wis., died August 31 after an illness of three months. Mrs. Graf was the daughter of August Manegold, founder of the stone company, and widow of William Graf, president of the old Graf Candy Co. in Milwaukee.

WILLIAM MOORE CAMERON, well known limestone manufacturer throughout eastern and northern Ontario, Canada, passed away August 9 at his home in Carleton Place, Ontario. He was 87 years of age. Mr. Cameron had been actively engaged in the lime manufacturing business for more than 50 years, having purchased the company of the late Napoleon Lavallee in 1889. He expanded the business and production facilities over a period of years, retiring in 1944 after selling the business to Stewart J. Neilson who is operating under the name of Carleton Lime Products Company. Mr. Cameron acted as adviser and consultant to Mr. Stewart during the past three and a half years.

RICHARD P. DOOLAN, who was credited with being among the first to introduce the manufacture of cement to California, died August 18 at his home in San Francisco, Calif. He was 87 years old. Mr. Doolan was a partner in the Holmes Lime Company.

MAURICE HOOFF, general production manager of the Hyster Co., Portland, Ore., died August 22 at the age of 47. Mr. Hooff had been connected with the company since its first day of operation, and has been in charge of production at the factories in Portland, Ore., Peoria and Danville, Ill., for the past several years.

FREDERICK E. PAULSON, for many years vice-president in charge of traffic with Lehigh Portland Cement Co., Allentown, Penn., died recently at Grand Rapids, Mich., where he has lived since leaving Allentown last June. He was 83 years old.

PAUL T. BEZ, president and founder of the Mayer-Bez Stone Co., East Orange, N. J., died recently after a short illness. He was 78 years of age. Born in Germany, Mr. Bez came to this country in 1885 and entered the stone contracting business as a foreman with the Mayer Stone Co., Newark, N. J. In 1900 he moved to East Orange and founded the Mayer-Bez Stone Co. He retired in 1942 and moved to Glen Ridge in 1944.

JULIUS F. STONE, SR., chairman of the board of the Columbus McKinnon Chain Corp., and the Chisholm-Moore Hoist Corp., Tonawanda, N. Y., died recently at his home in Santa Monica, Calif.

EARL J. SHERWOOD, president of the Great Lakes Concrete Pipe Co., Buffalo, N. Y., died at his home recently after a brief illness. He was 49 years of age. Mr. Sherwood became president of the company in 1929 after serving as Buffalo district manager of the American Construction Company.

ARTHUR LAMOTTE, who had been manager of the technical service section of the explosives department of E. I. duPont de Nemours & Co., Wilmington, Del., from 1916 until his retirement in 1941, died recently at the home of his nephew, Dr. Robert S. LaMotte, in Oakland, Calif., where he was visiting at the time of his death. He was 76 years old and had been in the explosives industry for 45 years. Mr. LaMotte had gained wide recognition for many important developments in manufacturing techniques and broadening the industrial uses for high explosives.

WILLIAM N. BOSLER, assistant sales manager for the Kentucky Rock Asphalt Co., Louisville, Ky., died recently. He was 60 years old.

ROGER W. LOMAX, manager of a coal and cement block company at Mansfield, Ohio, died July 31 when he was buried under 40 ft. of sand in a bin at his plant when he attempted to free clogged sand.

HENRY C. RENKER, owner of the Ideal Builders Supply and Fuel Co., Cleveland, Ohio, died July 11. He was 66 years old. Mr. Renker had formed the Renker Cement Stone Co. before incorporating his building supply firm, which he had directed as president since 1909. He was a director of the Independent Brick and Tile Co. and the Brooklyn Mortgage Co.

ROBERT M. MCGRAW, former general manager of the Potash Company of America, Carlsbad, N. M., died July 15 in Golden, Colo.

HARRY W. HOBSON, assistant director of sales in the Explosives Department of E. I. duPont de Nemours & Co., Wilmington, Del., died July 28 after an illness of about a month. He was 64 years old and was to have retired August 1.

MRS. MARY LEWIS BENNETT, widow of H. P. Bennett, president of the Bennett Concrete Stone Co. before his death in 1944, passed away August 19. She was 68 years of age.

ARTHUR C. ZELIN, partner in the Art Stone Co., Minneapolis, Minn., died recently at the age of 54.

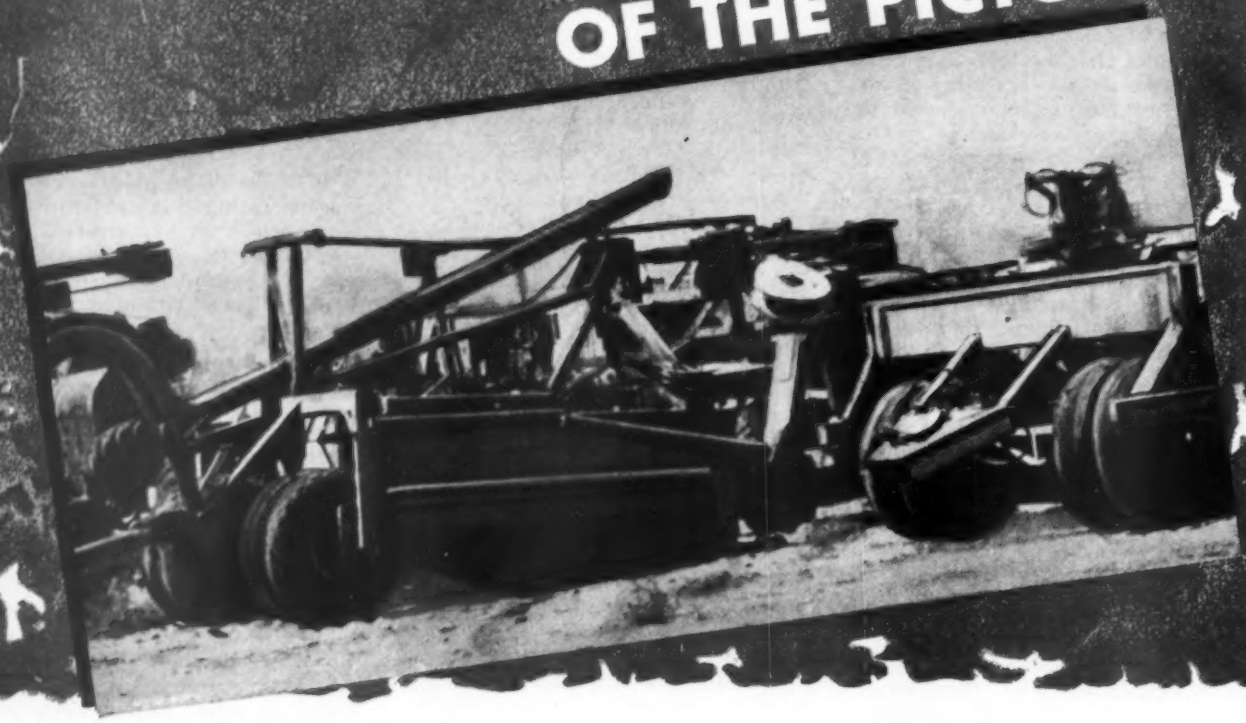
HENRY E. NELCH, a member of the building materials firm of Henry Nelch and Co., Springfield, Ill., died suddenly on July 30 while attending the annual picnic of the Sangamo Club. He was 45 years old.

J. S. CABLE, for a number of years identified with the Minnesota Mining and Manufacturing Co., St. Paul, Minn., passed away recently. Mr. Cable was a director of the National Industrial Sand Association.

20th Anniversary Marked By the More Sand Co.

IN RESPONSE TO LOCAL DEMAND for sand products, Roy More organized a sand company at Junction City, Kans., in 1927. From a very small beginning 20 years ago, the present substantial company has grown to a rated sand capacity of 100 t.p.h. The plant now produces seven different mesh sizes of sand, taken from the Republican river by a new dredge equipped with a Swintek screen nozzle.

KEEP RUST OUT... OF THE PICTURE



WHEN YOU lay up your equipment, brush *Texaco Rustproof Compound* over all exposed metal surfaces. They'll be safely and economically protected against rust by a soft, self-healing, *waterproof* film that removes easily when your equipment goes into service again.

Texaco Rustproof Compound not only prevents rust from getting a start on clean metal — it also gets right under existing rust, stops it from going further, and loosens it for easy removal. *Texaco Rustproof Compound* never hardens or chips off. It lasts long and costs little. In fact —

The cost of rustproofing every machine in your yard with *Texaco Rustproof Compound* is far less than the cost of repairing the possible rust-damage to just one piece of equipment.

Keep rust out of *your* picture this winter. Get *Texaco Rustproof Compound* and helpful suggestions for its use from the nearest of the more than 2500 Texaco distributing plants in the 48 States. Or write The Texas Company, 135 East 42nd Street, New York 17, New York.

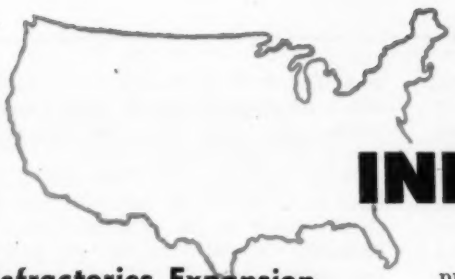
EFFECTIVE PROTECTION FOR METAL EVERYWHERE

Use *Texaco Rustproof Compound* to protect metal everywhere. Gas holders, water works, sewage disposal plants, bridges — wherever metal is exposed to weather, or corrosive chemicals and fumes — *Texaco Rustproof Compound* gives protection at low cost. Texaco's 36-page book "Rust Prevention" tells the whole story, offers many money-saving suggestions. Write for your copy today.

TEXACO

TEXACO Rustproof Compound

Tune in . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Sunday night. See newspaper for time and station.



INDUSTRY *news*

Refractories Expansion

BASIC REFRACTORIES, INC., Cleveland, Ohio, has recently completed the installation of an additional refractories kiln at its Maple Grove (Ohio) plant. The new rotary kiln is equipped with a stack 125-ft. high and 12½-ft. in diameter, largest built by Patterson-Leitch Co., Cleveland; and the largest hood built by Allis-Chalmers Corp. In addition, the company has recently brought out a new Cuban ore refractory for air-emplacement called "Gunchrome" and a special gun utilizing compressed air to blow the product into steel-making furnaces at the rate of 100 lb. per min. H. P. Eels, president, stated that this expansion was made necessary by the unprecedented demand for basic refractories.

Resume Pit Operations

WALKER SAND AND GRAVEL CO., Clay Center, Kan., is ready to resume operations after the June flood severely damaged the plant. Much of the equipment had to be replaced, including the barge, main motor and pump. Audley Walker and his son, Carmen, operate the plant plus adjacent farm land, 15 acres of which were also inundated by the flood.

Calcium Carbonate Plant

GEORGIA MARBLE CO., Tate, Ga., is constructing a $250,000 plant at Tate for the grinding and processing of calcium carbonate. According to James R. Cowan, president, the plant is expected to be in production early in 1948. The new plant will be under the direction of J. W. Dent, vice-president and general manager of the calcium products division of the company.

Stone Companies Merge

FRANKLIN LIMESTONE CO., INC., Nashville, Tenn., has recently been incorporated, purchasing the rock crushing plants and quarries formerly operated by Franklin Limestone Co., Middle Tennessee Stone Co., and West Tennessee Limestone Co. The four plants now under one management are all located in central Tennessee and offer truck delivery of all sizes of stone for general contracting and highway construction; and in addition the company maintains a fleet of trucks fitted for agricultural limestone spreading. All four properties are served by railroad and both crushed stone and agricultural limestone are shipped by this means as well to points as far as Mississippi, Kentucky and Alabama.

Underground mines are operated at both Franklin and Waverly, with the advantage of no seasonal interruption. Officers of the new corporation are: Cale P. Haun, president; A. B. Rodes, vice-president, general manager; F. I. Morgan, secretary. Directors are H. E. Rodes, A. B. Rodes, C. P. Haun, Mrs. Julia F. Haun, W. J. Wallace and L. Howard.

Making Rockwool Batts

INDUSTRIAL PRODUCTS CORP., Nashville, Tenn., has recently installed a Carney rockwool batt machine at its new three cupola mineral wool plant at Mt. Pleasant, Tenn. Rated capacity of this new plant is in excess of 100,000 sq. ft. of batts per day plus added tonnages of granulated, loose and industrial rock wool products.

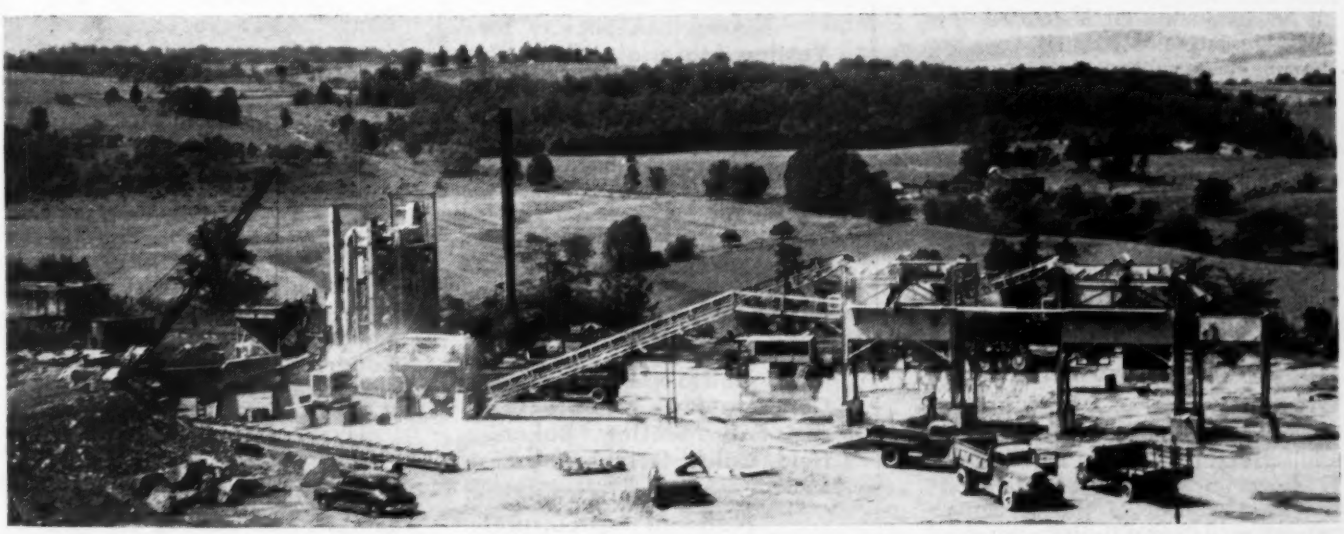
Present at the start of operations were several officers of Industrial Products Corp., including Joe E. Johnson, Jr., president; and also H. E. Carney, Jr., president, Carney Co., Inc., manufacturers of the batt machine, whose engineers supervised the installation. United States Gypsum was represented by A. E. Hughes, Chicago, insulation products sales manager; and National Gypsum by Allen Douglas, Buffalo, insulation sales manager.

Four Million Safe Manhours

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has passed the four millionth hour in its Cape Girardeau plant without a lost-time accident. In recognition of Marquette's safety slogan: "four million manhours without an accident is no accident," Anderson Hayden, safety engineer at the Cape Girardeau plant, has been asked to address the National Safety Council, October 8, at its annual convention in Chicago.

Brazil Cement Plants

CIA DE CIMENTO PORTLAND, Rio de Janeiro, has started operation of its new cement mill with a capacity of 50,000 bbl. per month. An additional kiln to be completed soon will double this plant's output. A second mill is being built in Porto Alegre. Barsotti Jor, former chief chemist of the Maua mill, a Lone Star subsidiary, is technical director of the new plant.



Crushing plant of Worlock Stone Co., Inc., near Canastota, N. Y. Capacity is 110 t.p.h. Power for crushing operations and an asphalt plant is supplied by a Caterpillar Diesel driving an electric generator

Builder's Supply Expansion

FISCHER LIME & CEMENT CO., Memphis, Tenn., held formal opening last month of its new office building. The completion of the offices marks the latest step in a plan of company modernization and expansion, including a new concrete block and brick plant with automatic equipment and steam curing rooms; new cement and lime storage and shipping quarters; a recently completed millwork and hardware store; and a new steel warehouse. Soon to be completed is a ready mixed concrete plant with a capacity of 350-cu. yd. per hour.

Added S & G Capacity

GUARANTEED GRAVEL & SAND CO., Mankato, Minn., built a new plant for added capacity when that of the original plant, that has been operated for 25 years, proved inadequate. The new plant is capable of producing 800-cu. yd. per day. A Sauerman cableway supplies the plant with material from a deposit near the Blue Earth river. A Universal washing, screening and crushing plant produces aggregate of several finished sizes, which is either stockpiled or placed in Diamond truck hoppers by an American crane (three American cranes are in use at the plant). A Katolight generator powered by a Cummins Diesel provides power for the plant.

Start Gypsum Production

NATIONAL GYPSUM CO., Buffalo, N. Y., has started operations in its new $6,500,000 plant in Baltimore, Md. The new plant is scheduled to manufacture sufficient wallboard, lath and plaster for 40,000 homes per year. M. H. Baker, president, stated that the plant is the largest and most modern in the industry, and has been under construction for 1½ years.

The company owns three freighters that will make the run between Baltimore and Nova Scotia, where the supply of raw material is located. The ships were bought recently from the Canadian Government.

Huge Plant Planned

MINNESOTA MINING and Manufacturing Co., St. Paul, Minn., has announced plans for a $1,750,000 plant of steel and masonry design to be built on a 250-acre tract near Hastings, Minn. This is part of a ten million dollar expansion program planned for the immediate future.

Depletion Allowances Granted

PRESIDENT TRUMAN recently signed a bill granting depletion alowances to producers of a long list of minerals and metals. Most of the deductions were allowed during the war, but were permitted to expire last December 31. The new law renews them, makes them permanent, and adds several new minerals to the list.

Some of allowed percentage deductions are: fluorspar, vermiculite, mica, talc, barite, rock asphalt, pyrophyllite, phosphate rock and trona, 15 per cent. Other features of the law govern inventory losses and special income tax exemptions.

Buy Gravel Land

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., recently completed purchase of 232 acres of sand and gravel land from the Azusa Foot-Hill Citrus Co. of Azusa. The tract of land lies east of Los Angeles in the San Bernardino valley. Consolidated Rock Products Co. and its predecessor companies have leased this site from the recent owner since 1914, and during this time it is estimated that 12,000,000 tons of sand, gravel and crushed stone have been excavated and processed for construction work.

With consumation of the sale, plans have been drawn up to modernize the entire plant at an estimated cost of $250,000. In addition, the site will be landscaped and fenced with a 6-ft. chain link wire fence around the entire property.

S. D. State Cement Plant

A NEWSPAPER in South Dakota and others are advocating a second state-owned cement plant. Profits of $348,096 from operations of the one existing state cement plant have just been divided between the state highway fund and the general fund at the close of the company's fiscal year.

Coming Conventions

American Concrete Pipe Association, 40th Annual Convention, Hotel Roosevelt, New Orleans, La., March 11-13, 1948.

American Road Builders' Association, 45th Annual Convention, Washington, D. C., January 26-28, 1948.

American Road Builders' Association, Exposition of new Construction Equipment, Soldier Field, Chicago, Ill., July 16-24, 1948.

American Society for Testing Materials, Annual Meeting and Exhibit of Testing Apparatus and Related Equipment, Book - Cadillac Hotel, Detroit, Mich., June 21-25, 1948.

American Society for Testing Materials, Committee Week and Spring Meeting, Washington, D. C., March 1-5, 1948.

Agricultural Limestone Division of National Crushed Stone Association, 3rd Annual Convention, Netherland Plaza, Cincinnati, Ohio, January 29-30, 1948.

California Associated Concrete Pipe Manufacturers, Fall Meeting, Bakersfield, Calif., October 24-25, 1947.

National Agricultural Limestone Association, 3rd Annual Convention, Hotel Statler, Washington, D. C., January 14-15, 1948.

National Concrete Masonry Association, Directors' Meeting and Southeastern Region Meeting, Roosevelt Hotel, New Orleans, La., November 8-11, 1947.

National Crushed Stone Association, 31st Annual Convention and Exposition, Netherland Plaza, Cincinnati, Ohio, January 26-28, 1948. Exposition January 26-30.

National Lime Association, Annual Convention, The Homestead, Hot Springs, Va., April 4-6, 1948.

National Sand and Gravel Association, 32nd Annual Convention, Netherland Plaza, Cincinnati, Ohio, January 20-22, 1948.

National Ready Mixed Concrete Association, 18th Annual Convention, Netherland Plaza, Cincinnati, Ohio, January 21-23, 1948.

National Safety Congress and Exposition, Chicago, Ill., October 6-10, 1947. Congress sessions at Stevens, Congress and Palmer House hotels; public safety sessions, displays and motion pictures at Sherman Hotel; and industrial safety exhibits and films at Stevens Hotel.

Electrical Precipitator Dust Collector Installed

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., is installing a new type dust collector at its Sandt's Eddy plant that works on the electrical precipitator principle. J. A. Gish, Jr., plant manager, stated that the collector will require about 45,000 volts of electricity to magnetize dust particles in the flue gasses. The magnetized particles will be attracted to and held by banks of electrodes, which will discharge to settling chambers.

The precipitator was ordered several years ago, but due to delays caused by the war, it is just being delivered. Piers, footings and incidental concrete works for supporting the steel work of the new mechanism is now completed behind the waste heat boilers at the base of the main stack, to which the gasses will be discharged after passing through the new collector. The new collector will supplement the mechanical dust collectors that were installed in all departments when the plant was built in 1925.

Car Shortage Problem

G. A. AUSTIN, president, National Crushed Stone Association and also president, Consolidated Quarries Corp., Decatur, Ga., said recently that the sand, gravel and crushed stone producers in the Southeast are only getting 40 to 45 per cent of the minimum railroad cars needed. Private contractors as well as city, county and state governments were all months behind in highway and other construction work as a result of this lack of transportation.

Mr. Austin pointed out that the car shortage was chiefly due to the fact that so many cars are being diverted to coal and grain shipments in connection with European relief. He continued by saying that this shortage of transportation which had caused Consolidated Quarries Corp. to close down due to lack of space for additional stockpiling, was evident in many other parts of the country.

Plan for Expansion

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., sent three company engineers who were to work on the contemplated expansion of the Irwindale plant to three large quarry operations in Arizona to get factual operating data on various types of equipment. Two of the operations visited were Phelps Dodge Corp. open pit copper mines at Morenci and Ajo, and the third was the Castle Dome workings of the Miami Copper Corp.

The Morenci plant, started in 1941 and completed in early 1942, was built to process copper ore, and includes some of the latest equipment to crush and screen ore known to the industry. The primary crusher is a 60-in. Traylor gyratory, fed directly from 80-ton quarry cars. Discharge from the primary is conveyed to four 7-ft. Symons cone crushers, each of which discharges to two 7-ft. Symons cones, for a total of 12 secondary crushers. Plant capacity is 50,000 tons per 24-hr. day.

By visiting these other plants, the Consolidated Rock Products Co. engineers gained many ideas and suggestions concerning large tonnage operations to take back to Los Angeles and incorporate in the revamping of the Irwindale plant. Some of these ideas concerned a hydraulic ram under the gyratory crusher for changing the eccentric; an oil centrifuge for cleaning crusher oil; an oxygen-electric arc torch with hollow electrode rods for cutting or burning iron out of crushers where accessibility is low; and wedges instead of nuts for tightening adjustment caps on crushers, which greatly reduces dismantling time.

1946 Figures for Sand And Gravel Production

SAND AND GRAVEL PRODUCTION IN 1946, as reported to the Bureau of Mines, reached 254,131,000 short tons —valued at $171,386,000, which represents an increase of 30 per cent in quantity and 33 per cent in value over the 1945 figures. Approximately 76 per cent of this output was supplied by commercial plants and 24 per cent by Federal, State, county and municipal governments. The largest increases were reported for sand and gravel for building purposes, which reflects the great expansion in the construction industry.

Sales by commercial producers in 1946 were 192,092,566 short tons, an increase of 26 per cent over 1945. California was the largest producer in 1946 as in 1945, with Illinois, Michigan, Wisconsin, Ohio, New York, Texas, Minnesota and Pennsylvania following in the order named. The nine states named, each with a production in excess of 10,000,000 tons, accounted for 52 per cent of the total production.

Comercial operators' sales in 1946 for all types of sands, with the exception of molding and fire or furnace sand, increased in 1946. Sales of gravel by the same operators, with the exception of railroad ballast, also increased last year over the year preceding. The upward trend was due to expansion of gravel output, for the most part, as the quantity of sand utilized was 15 per cent below that reported in 1945 (with the exception of industrial sands).

Washed, screened or otherwise prepared sand and gravel comprised 91 per cent of the total commercial production, and averaged 80¢ per ton compared to 50¢ for unprepared material. Sales of glass sand reached 4,848,602 tons with an average value of $1.97 per ton, an increase of 4 per cent over the 1945 figure. Leading producing states in the order named were Illinois, West Virginia, Pennsylvania, Missouri and California. Output of molding sand was 6,973,906 tons, a decrease of 3 per cent, with an average value of $1.37 per ton. Sales of grinding and polishing sand (including blast sand) increased 41 per cent, averaging $1.52 for 906,889 tons produced.

Fire or furnace sand decreased approximately 20 per cent in tonnage for a total of 248,866 tons at an average value of $1.34 per ton. Sales of engine sand increased 1 per cent for a total of 2,797,132 tons averaging 69¢ per ton. Production of filter sand increased 43 per cent for a total of 157,511 tons with an average value of $1.81 per ton.

Of the total commercial output, 51 per cent was shipped by truck, 40 per cent by railroad and 9 per cent by waterway. The percentages become 64, 29 and 7, respectively, when Government-contractor output is added, for this classification predominantly moves by truck.

Marquette Wins Award

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., recently won first place with its annual report to stockholders in the national contest sponsored by the magazine *Financial World*. The company's annual report was judged best in competition with more than 3,500 other companies, covering 80 different industries.

This is the third year that Marquette has been awarded first place among all cement industry reports; and this year the report also won a Certificate of Highest Merit in preliminary competition. At a banquet to be held at the Hotel Pennsylvania, New York, October 10, President W. A. Wecker will receive an "Oscar of Industry," signifying the company's first place position.

Industrial Miners Meet

INDUSTRIAL MINERS DIVISION, American Institute of Mining and Metallurgical Engineers, will hold a convention at Atlanta, Ga., October 8 and 9. Following the meeting, specialists in the fields of mining, chemicals and metallurgy will make survey tours of natural resources of Georgia. Sectors to be covered will be rock quarry areas of Stone Mountain and Lithonia; and plants in the Cartersville area, plus a few additional sections of the state.

Trona Source in Wyoming

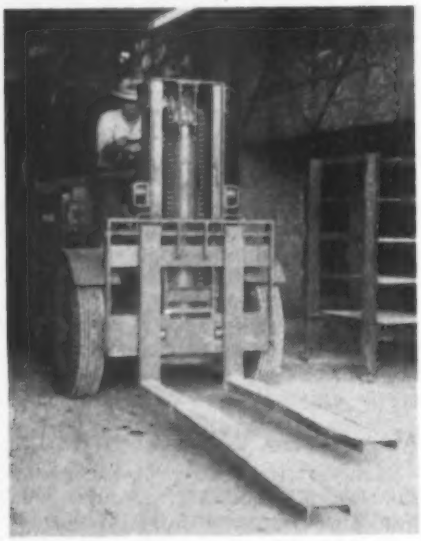
WESTVACO CHLORINE PRODUCTS CORP., Newark, Calif., recently announced discovery of a bed of trona 30 miles west of Rock Springs, Wyo. W. B. Thom, president, said that indications were that several million tons of extremely high purity sodium sequi-carbonate were available for mining and conversion to soda ash. The deposit was reached at a depth of 1,490 ft. by a shaft 12-ft. in diameter.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Lift Truck Extensions

AT the Otto Buehner & Co. concrete products plant in Salt Lake City, Utah, a lift truck has been equipped with two channel irons riding over



Channel iron extensions over lift truck forks

the forks which came with the original equipment. These channel irons give the lift truck extensions which reach under longer racks. Phil Buehner, one of the members of the company, is shown at the wheel of the lift truck. After the photograph was taken, it was explained that the picture was desired for the Hints and Helps department of ROCK PRODUCTS. "That's where I got the idea from in the first place," explained Phil. So some people do read these columns.

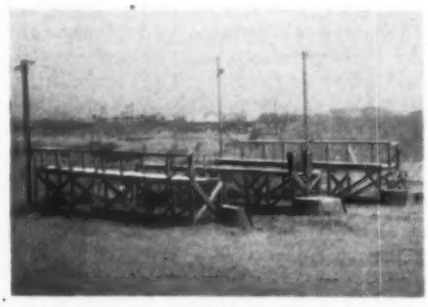
Uses for Old Tire Rims

ONE of our field editors at one time started making a collection of photographs showing novel uses to which old steel oil drums could be put. He is now playing with the idea of collecting a similar batch of pictures showing how old automobile tire rims could be used.

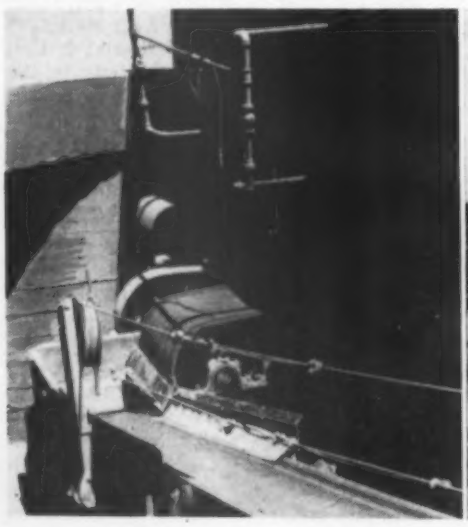
A favorite use for this item is for a drum to handle the small diameter cable commonly used to change the location of the swivel spouts required to fill bins around a ready mixed concrete plant. The illustrations show that the idea, while very useful, is not confined to one locality. One photograph was taken at the plant of Albuquerque Gravel Products Co., Albuquerque, N. Mex., and the other was taken at the United Concrete Pipe Company plant at Baldwin Park, Calif. In both cases the old automobile tire rim was mounted at a convenient point so that the operator could spot the loading spout over any desired bin without going to the top of the structure.

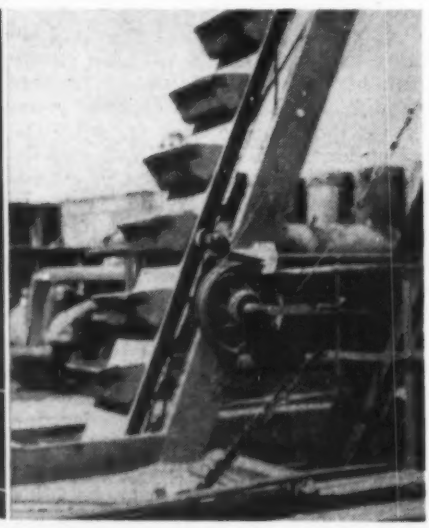
Wash Racks for Mix Trucks

IN the Southwest at an operation where a considerable fleet of ready mixed concrete trucks is kept in operation, wash racks are provided of the type shown in the illustration. Two trucks can be washed or inspected at the same time, and the elevated platforms permit a quicker and better job to be done.



Two trucks can be washed at the same time with these wash racks

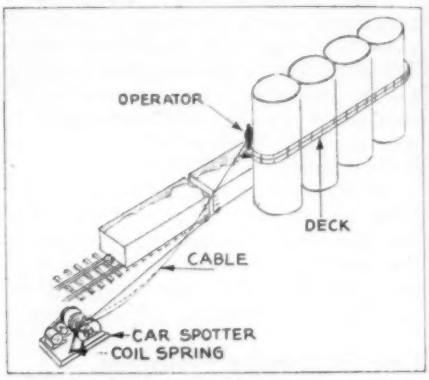




Examples of the use of automobile tire rims for cable drums to control bin spouts. To the left, installation at Albuquerque Gravel Products Co., right, cable drum at United Concrete Pipe Co.

Remote Control for Car Spotter Winch

PALMER CRUSHING Co., Slinger, Wis., has developed a simple device for "remote control" operation of its car spotting winch. The operator on the spout level deck around the silos who controls the flow of aggregate to the cars may move a loaded car out and bring an empty up without leaving his station. This is done by means of a ¼-in. cable, attached to the control arm of the winch, which runs to the operations deck: a slight pull on the cable engages the electric motor driven winch drum, moving the car or cars ahead to any desired position. A large coil spring returns the control arm to non-operating position when the cable is released.



Showing how operator controls car spotter

Fine Wire Welding

IN WELDING FINE WIRES together, such as in forming thermo-couples, a 20- or 30-ampere d.-c. arc between two carbons is easier and faster than oxyacetylene or atomic-hydrogen welding. Wires are heated too much with gas welding and do not fuse readily. Twin carbons, though not as hot as an atomic-hydrogen arc, give sufficient heat and permit a quick and neat job being made, according to General Electric engineers.

Direct Stream from Quarry

WARNER Co., Philadelphia, Penn., has constructed a suspension bridge carrying a flume over its Bellefonte lime quarry and mine to divert an adjoining stream. The flume is 142-ft. long, bridging a pit 60-ft. deep and with cables capable of supporting over 200 tons. The stream is thus carried across the operation that would otherwise flow directly into the pit and mine, making it necesary to install large capacity pumping equipment.

Conveyor Does Two Jobs

AT the Sutherland Ready Mixed Concrete Co. plant at Pullman, Wash., sand and gravel is unloaded from cars to a belt conveyor. This builds up a

Flop gate at discharge end of stockpiling conveyor (see arrow) diverts gravel to chute

stockpile of sand as shown in the illustration. When gravel is unloaded, the curved flop gate at the discharge end of the conveyor is lowered and the gravel is chuted to the narrow spout located just above the cone of sand. This arangement by-passes the sand pile and delivers the gravel to the inclined belt serving the Noble batching plant. The gravel can go into the steel bins of the batching plant or continue on across the top of the plant to ground storage at the opposite side of the plant from the sand storage pile. Two Scoopmobiles are available for loading either aggregate to trucks.

Vibrating Grizzly

SEVERAL ATTEMPTS have been made in the past by operators and manufacturers to operate a vibrating screen or vibrating grizzly ahead of the crushing unit with the vibrating screen actuated by the motion of the crusher pitman or moving jaw.

Installations of this type were not eminently successful mainly due to the inability to keep the two separate units fastened together. Many welding stunts have been tried to permanently mount the screen to utilize the motion of the pitman but on checking up after a year or so, it has been found that the idea has been abandoned as too costly to maintain.

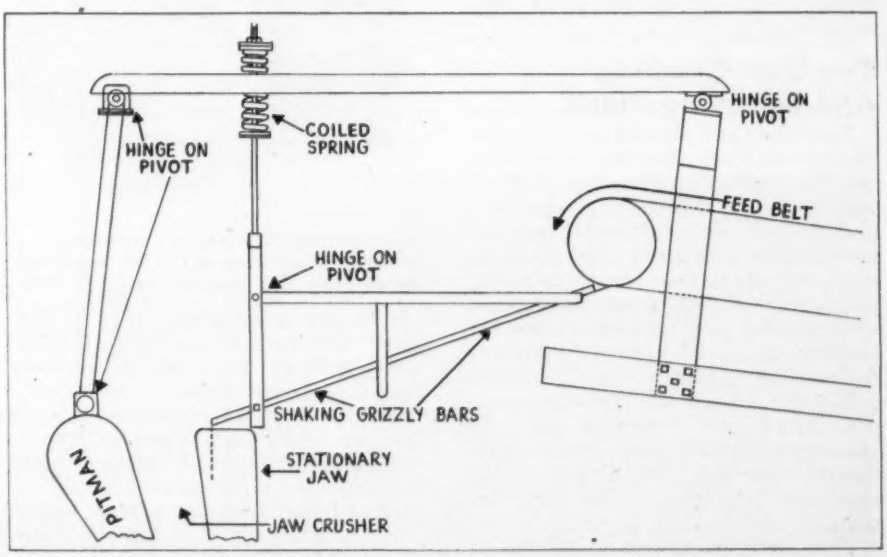
It is believed, however, that Eugene Sundt, president of the Albuquerque Gravel Products Co., Albuquerque, N. Mex., has designed and installed a mechanism that will and does work satisfactorily without any upkeep whatsoever. He has combined a mechanism supporting the grizzly ahead of the 9- x 36-in. Diamond jaw crusher that gives the grizzly a smooth but effective movement. A study of the illustrations and the sketch show that the movement of the top of the pitman is transmitted to the lower end of the grizzly in such a manner that the grizzly has an up and down motion which is imparted without shock, yet in action it does an excellent job in assisting the movement of materials over the grizzly and at the same time keeps the openings free.

Ramp for Loading Gondolas

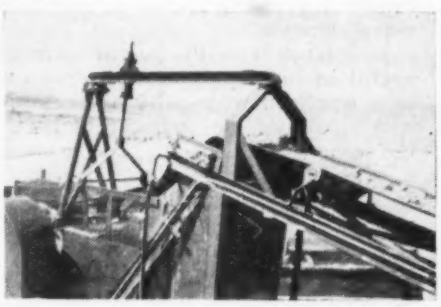
THE FAIR OAKS GRAVEL CO. has an operation almost directly across the American river from the plant of the Pacific Coast Aggregate Company's Fair Oaks plant near Sacramento, Calif. As the former company has no rail connections, such shipments are trucked across the river and loaded to gondolas. A loading ramp has been

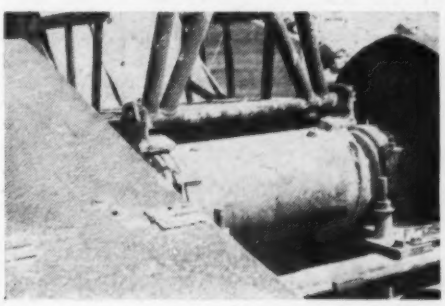
Specially designed ramp for truck-loading gondola freight cars

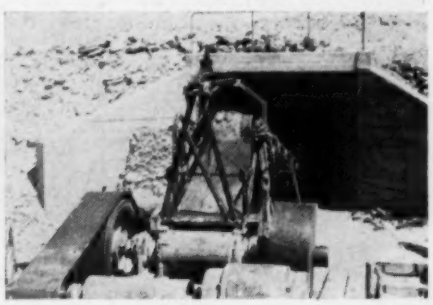
provided so that trucks can back out onto the structure. When the car is moved, the outer edge of the ramp can be raised with a cable arrangement that functions from the car mover. The pivotal point for the extension is about under the rear wheels of the truck shown in the illustration. When in use, the outer edge rests on the gondola and the inner edge of the cap of the front part of the main section. The inner edge of lip timbers are chamfered off so that the lip will not bind when raised or lowered the few inches necessary when cars are moved.



Showing how grizzly is connected to jaw crusher to obtain reciprocating action





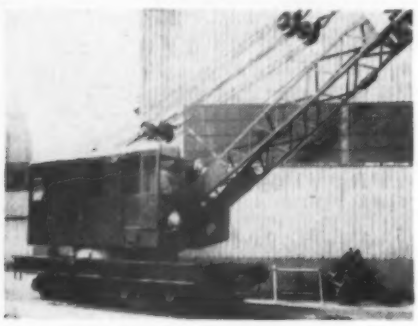


Three views of mechanism connecting grizzly to secondary jaw crusher to impart reciprocating action

new MACHINERY

Locomotive Crane

AMERICAN HOIST AND DERRICK Co., St. Paul, Minn., has designed a Diesel-electric locomotive crane based on patents under which electric power is



Diesel-electric locomotive crane

used to travel the crane along the rails while Diesel power operates the turntable and load lifting mechanism. In addition to "hook" work, this Diesel-electric unit is used with a grab bucket, grapple, magnet, and for car switching. Another patented feature is the use of electric power from the traction generator for energizing the magnet, with over-excitation for maximum loading.

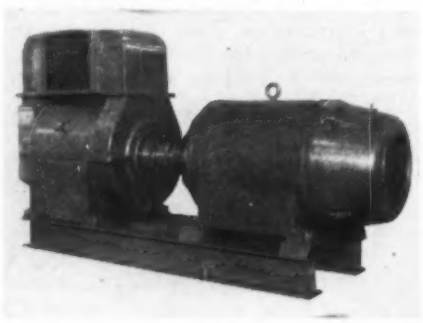
Two-Unit Crushing And Screening Plant

NEW HOLLAND MANUFACTURING Co., Mountville, Penn., has developed what has been termed a two-unit crushing and screening plant. This one-man, push-button controlled crushing unit is adaptable to either gravel crushing or quarry operations, according to the manufacturer. The Diesel power plant operates the 3030 double-impeller breaker while an electric generator driven from the same Diesel supplies power for driving the feeder, conveyors, screen and elevating wheel on the screening unit. Individual electric motor drives are controlled from the operator's platform of the crushing unit.

This plant is capable of producing one, two or three products. Used in conjunction with the unit are portable conveyors for bin loading or stockpiling. The crushing or breaking unit is a compact semi or full trailer assembly 28 ft. long, equipped with rear axle equalizers and with a removable front axle assembly. Warner electric brakes are controlled from the towing tractor. As no secondary crushing unit is required, it is equipped with a lightweight screening plant. Oversize is returned from the top deck of the screen to a return conveyor to the breaker through an elevating wheel arrangement. The crusher in this plant is the New Holland 3030 double impeller impact breaker which serves both as a primary and secondary crusher. This two-unit portable crushing and screening plant has a capacity up to 200 tons per hour of crushed stone.

Unit-Cooled Generator

GENERAL ELECTRIC Co., Schenectady, N. Y., has announced a line of totally-enclosed, unit-cooled generators for use in motor-generator sets or in other



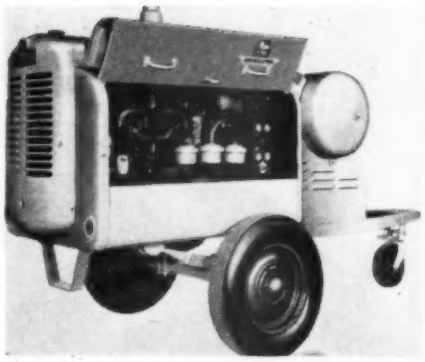
Two-unit motor generator set, consisting of an induction motor rated at 135 hp., and a unit-cooled shunt d.-c. generator rated at 90 kw.

generating applications in any non-hazardous atmosphere where the ratings involved make totally-enclosed, fan-cooled construction impractical.

Available in ratings from 30 to 150 kw., these generators are said to be especially suitable in cement mills. Cooling of the generator is accomplished by an air-to-air surface cooler.

Portable Compressor

LE ROI Co., Milwaukee, Wis., has brought out its "85" Airmaster com-

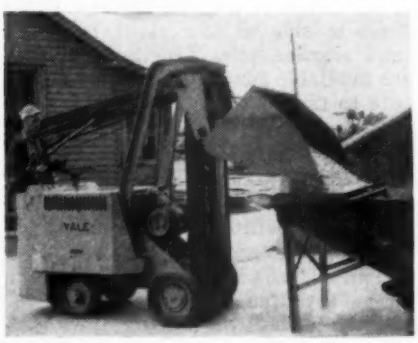


Portable compressor which may also be obtained on skids

pressor unit mounted on two pneumatic tired wheels. It is powered with the Le Roi model D201 valve-in-head engine. The compressor, built integrally into the engine block, is liquid cooled and also has pressure lubrication, replaceable cylinder sleeves, and precision bearings. This unit is regulated by the patented Econotrol controlling compressor operation automatically according to the demand for air. Electric starting and the electric hourmeter are supplied as standard equipment.

Electric Scoop Truck

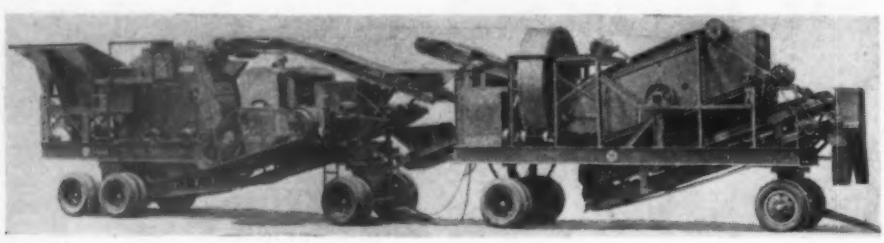
THE YALE & TOWNE MANUFACTURING Co., Philadelphia, Penn., has designed a scoop-dump electric truck to



Scoop-dump electric truck equipped with mechanism for lowering and raising scoop for self-loading and dumping

handle batching jobs superseding wheelbarrows.

This truck is said to be particularly useful in batching processes because it is equipped with a lift mechanism which permits the operator to lower the scoop for self loading, and to raise it to the desired height for dumping. In addition, a dump mechanism makes it possible to tilt the scoop at a wide range of angles and thereby regulate the rate of discharge. In other respects, this electric truck is the same as the conventional fork truck.

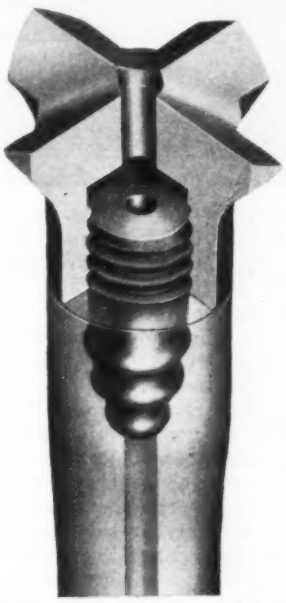


Two-unit crushing and screening plant

Stud Type Jackbit

INGERSOLL-RAND CO., Phillipsburg, N. J., has added to its line of drilling equipment a stud-type jackbit with an attachment member designated a jack-stud.

The bit has carefully worked out wing curbes which, it is claimed, enable it to retain new bit proportions through many resharpenings. Result-



Stud type jackbit with special attachment

ing small gage loss permits using successive bits with reductions in diameter of 1/16-in. or less per change. This makes it possible to start holes with smaller bits than those previously used and still bottom them at the same size as before. Drilling speeds are consequently higher than before and the time consumed per hole is less.

Improved Pulverizer

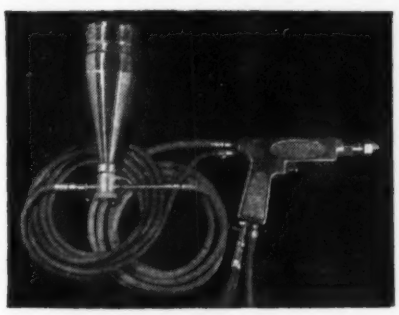
BRADLEY PULVERIZER CO., Allentown, Penn., has announced its new Type "H" Bradley Hercules mill. Accessibility and low maintenance cost are emphasized in the announcement which points out that the machine is now fed through the casing and screen, eliminating all feed spouts and hoppers.

The driving pinion, bearings and pinion shaft are contained in a cartridge which, when necessary, can be removed from the mill and a new cartridge replaced in a short time without disturbing the alignment of any part of the machine, permitting continuity of operation.

It is said to be very efficient, rugged and economical in operation, giving the same large output and fineness as the older types used extensively in the cement industry. The mill is also adaptable for pulverizing agricultural limestone, phosphate rock, and other industrial minerals. The machine shown in the illustration has been in operation at the Coplay Cement Co. plant for some time, and is said to have met every test. It is now in production for delivery in January, 1948.

Powder Metallizing

WALL COLMONOY CORPORATION, Detroit, Mich., has developed a powder metallizing unit for use in conjunction with its spray-weld process. With this unit it is said to be possible to combine the advantages of both welding and metallizing procedure. The unit is operated in the first part of the process as a powder metallizing unit to apply a uniform overlay of hard-facing alloy. It is then used as a conventional welding torch to fuse this sprayed overlay to the base metal to obtain a fusion or molecular bond, identical to that obtained when the



Gun to spray hard-facing alloy

same alloy in rod form is applied by acetylene welding.

There are only two control valves, both of which are mounted on the gun itself. Once adjusted, the powder flow may be stopped and started at will by pressing or releasing the trigger.

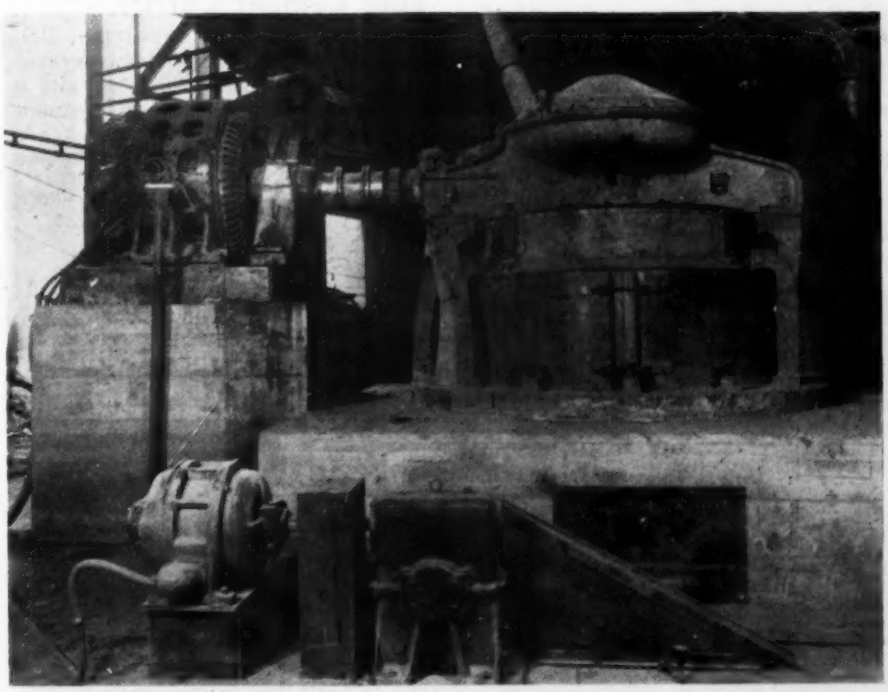
Circuit Breaker

WESTINGHOUSE ELECTRIC CORPORATION, Pittsburgh, Penn., has announced a Quicklag circuit breaker

Circuit breaker with thermal-magnetic trip

which has a tripping action that combines the inverse time limit characteristics of Bimetal thermal action on overloads with the operating speed of magnetic trip action on short circuits.

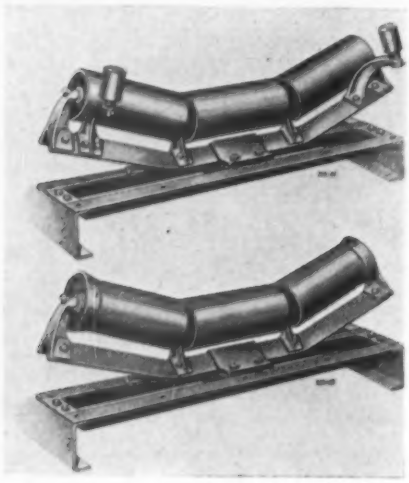
Available in single or double pole, 10 to 50 amperes, 125 to 125/250 volts a.-c., the breaker provides a redesigned "De-ion" arc chute that eliminates the need for a vent screen in the bottom, thereby permitting mounting flush to pan. Other improvements include: a sturdier operating handle; hole in handle permits more satisfactory method of attaching handle extension for two-pole operation; and smooth flush surface to eliminate dust traps.



Pulverizing mill with driving pinion, bearings and pinion shaft contained in cartridge which can be removed when necessary and replaced in a short time

Self-Aligning Idlers

THE JEFFREY MANUFACTURING CO., Columbus, Ohio, has announced improved types of self-aligning idlers for belt conveyors. In the illustration



Above, self-aligning idler with guide rollers, and below, the self-aligning idler with flared, friction-type end pulleys

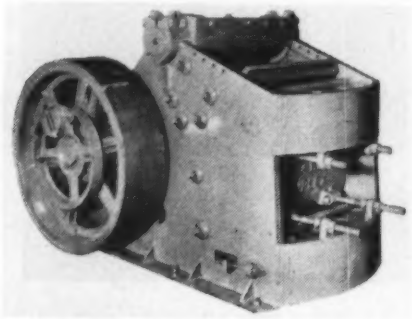
may be seen the positive type self-aligning idler (above) with guide rollers and (below) the self-aligning idler with flared, friction-type end pulleys adaptable for reversible belts.

Lightweight Jaw Crusher

STRAUB MANUFACTURING CO., Oakland, Calif., has brought out its Kue-Ken Simplex jaw crusher for users who desire a lightweight, large capacity unit to produce ¾-in. and 1-in. sizes of the hardest rock with low power requirements.

According to the manufacturer, the all-steel crusher embodies the patented Kue-Ken principle of crushing without rubbing, designed to increase jaw plate life. This crusher is said to require lubrication only once every six months. The hinge pin is sealed in oil, and all the operating mechanism is enclosed in a dust-tight, oil-tight housing. An oil pump delivers to the mechanism 200 to 300 gal. of filtered oil per hour, in addition to the splash system. An automatic pressure switch stops the crusher motor or engine if oil pressure is below standard. Large self-aligning SKF roller bearings in the side frames carry the eccentric shaft. The pitman is always in compression, and bears against the lower side of the shaft only. It is claimed that by putting this member in compression instead of tension, bearing caps and bolts are eliminated, permitting a 90 per cent weight reduction.

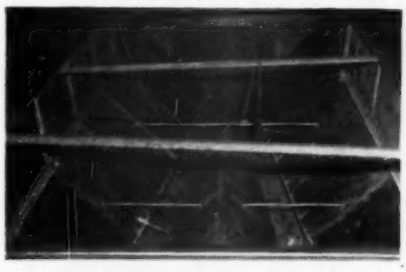
This crusher has a jaw opening of 10- x 36-in., or 12- x 36-in. The speed is 350 to 365 r.p.m., and the capacity is 40 to 50 t.p.h. at ¾-in. setting and 50 to 60 t.p.h. at 1-in. setting. Maximum horsepower requirement on hard rock is 40; softer rock requires less power. The weight is 16,500 lb. These crushers are obtainable in sizes from 7- x 12-in. to 25- x 42-in.



High-speed, lightweight jaw crusher

Bulk Cement Carrier

GRAMM TRAILER CORPORATION, Delphos, Ohio, has designed an aerated bulk cement carrier which permits a simple discharge mechanism. Normally the angle of repose of bulk cement is 50 deg., but when bulk cement can be aerated, its angle of repose is reduced by proportion with the volume of air used, to as low as 4 deg. To accomplish the aeration, a canvas belt is fitted into the groove or trough at the bottom of the vehicle which normally would accommodate an auger screw. The static presure does not exceed 2 lb., but is sufficient to make the top surface of the belt frictionless. It is this condition which permits the cement to flow at the low angle of repose.



Interior aerated bulk cement carrying unit

So that cargo discharged can be controlled to any requirements, two troughs are designed into the vehicle, and by a very elementary pipe manifolding the air chambers can be operated separately or together. If the cargo discharged has to be very slow, it is easily accomplished by opening the bleeder valve and permitting air to escape to such an extent that the flow of cement is to the desired quantity. On the other hand, with both bleeder valves closed and air delivered to both chambers, maximum cargo discharged is obtained; it is possible to discharge 125 bbl. of cement in eight minutes. Total load is 45,625 lb.

The air pressure in the chamber precludes any cement from filling the chamber; also, the weave of the belt is fine enough to permit the uniform exit of the air, but does not permit even the finest cement particles to seep through into the chamber.

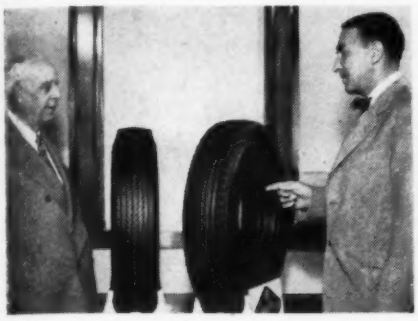
The vehicle is constructed of four 6-in. structural channels weighing 13.5 lb. per foot. These channels serve as the main frame of the vehicle and as the trough for the air chamber.

Three manholes of 23½-in. dia., equally spaced at 54 in. afford the method of loading. In addition to the cargo discharged being controlled by air pressure, two sliding gates at the discharge end are operated by levers which can be locked in any of five positions by inserting a pin through the levers and a selected hole in the position locking plate. A rubber-gasketed cover seals the discharge outlet during travel. For the purpose of easy access and replacements when necessary, the air chamber and belt assembly is made as a cartridge and can be withdrawn from the vehicle at any time by removing the two small cover plates at the front end and withdrawing the cartridge in a simple operation.

Bulk cement carrier is 18 ft., over-all length

Cushion Tires

GOODYEAR TIRE & RUBBER Co., Akron, Ohio, is now in production on a complete line of tires known as Super Cushion. The tires are said to require

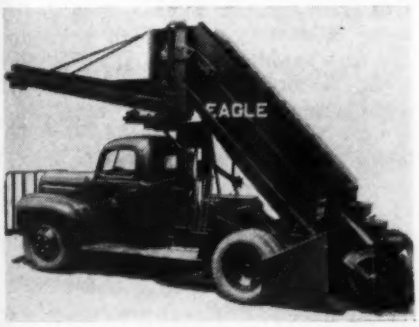


W. E. Shively, manager of Goodyear tire design, right, showing P. W. Litchfield, chairman of the board, the 7.60-15 super cushion compared with the conventional 6.50-15 tire

14 per cent less air pressure (from 4 to 6 lb. less per tire, depending upon the car which they equip) and are relatively lighter in comparison to their size than conventional tires. The manufacturer claims that road shocks are absorbed better with the new tire, particularly lateral shocks which are not cushioned by the car spring system, which is primarily for the purpose of softening vertical shocks. The current tire in most common use is the 6.00-16 size. On new cars with this type tire the comparable size is 6.70-15. It is designed for use on 15-in. wheels and rims, averaging 70 per cent of the width of the tire cross-section for new cars introducing the tires in the original equipment market.

Truck-Mounted Loader

THE EAGLE CRUSHER Co., INC., Galion, Ohio, has incorporated several new features in its model 400 truck-



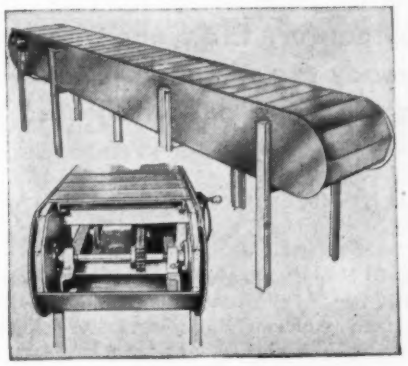
Loader which is designed for mounting on light truck

mounted loader to give increased speed and ease in maneuvering. This model has full hydraulic control, lower overhead clearance, conveyor discharge and positive crowd. It has a 3- to 5-cu. yd. per minute capacity. The full hydraulic controls operated from the operator's platform just behind the truck cab speed up operation of the loader. Overall clearance of the unit is 11 ft. 10 in. Rapid discharge of loose materials is assured by a conveyor discharge belt operating on a 180-deg. radius, capable of discharging wet material without depending on gravity flow. Approximate weight complete is 11,500 lb., and it may be mounted on any 1½- or 2-ton truck. Power is supplied by the truck engine through a power take-off from the transmission, a governor providing uniform speed.

Aluminum Belt Conveyor

PATRON TRANSMISSION Co., New York, N. Y., has designed a pre-fabricated, all-aluminum belt conveyor called the Mercury. All components such as chain, belt, sprockets, channels, angles, frame and other parts are constructed of heat-treated aluminum alloy. It is available in widths from 5 in. to 60 in., and heights from 15 in. up; the standard height is 36 in.

It is shipped pre-fabricated in 5 ft. sections which may be assembled in one continuous unit up to 150 ft. in



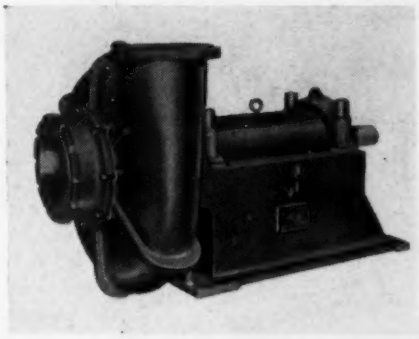
All aluminum belt conveyor

only a few minutes time. Any speed up to 100 ft. per minute may be obtained, according to the manufacturer. The load capacity is 250 lbs. per sq. ft., and the pulling load is 6100 lbs. The belt is supported by phenolic rollers, eight to each foot. Belt sections are ⅛ in. thick and 4½ ft. long.

Slurry Pump

PETTIBONE MULLIKEN CORPORATION, Chicago, Ill., has developed a slurry pump, the wearing parts of which are centrifugally cast of abrasion-resistant Diamond alloy. Centrifugal casting is the process of casting metal under pressure of centrifugal force developed through rotating the molds at high speeds during the period of solidification. This is said to produce a better casting by throwing the heavier, cleaner metal outward, and the impurities are brought to a point where they can be quickly removed by a rough machining of the centrifugal casting.

Some of the mechanical features of this pump include: A screwed fit with centering and alignment bands between end of shaft and impeller to assure alignment and easy assembly



Centrifugal slurry pump

and dismantling. A tapered fit between shell and backliner provides a tighter joint, reducing undercutting by abrasive particles. One-piece shaft assembly is heavy and compact. An inexpensive suction wear ring is provided at the point of greatest wear to prolong life of volute shell. S.K.F. ball bearings take shaft thrust and S.K.F. roller bearings are provided. The slurry pumps come in 12 models ranging in size from 5-in. suction, 3-in. discharge to 14-in. suction and 12-in. discharge.

Self-Priming Centrifugal Pumps

JAEGER MACHINE Co., Columbus, Ohio, has announced an interesting development in the design of its self-priming centrifugal pumps in which overall housings protect the engine as well as the pump from weather and dirt. Keeping water from sparkplugs, carburetor and crankcase insures quick starting and more efficient operation. Side panels give access to all operating controls. Enclosures on small pumps lift off when necessary, and on larger pumps the big housings give easier access to engine parts and the entire pump end is hinged to swing completely open.

Fast priming is accomplished by combining "inherent" priming action with "jet" priming, two independent actions which operate simultaneously. Other features include: replaceable liners or seal rings, self-cleaning shell design and open-type impellers which are adjustable for wear.

Overall housings protect self-priming pump

Over-all view of plant operations; sand and gravel plant to the right with pipe line from dredge and sand drags in foreground; conveyor inclining up to top of ready mixed concrete batching plant, to the left; and concrete products plant building, below

Combine Three Plants Into One

Terry Carpenter, Ltd., operates sand and gravel, ready mixed concrete, and concrete products plants as one integrated business

By W. B. LENHART

SCOTTSBLUFF, NEBR., is located on the North Platte river in the extreme western part of the state, about 21 miles from the Wyoming state line. Only a few short years ago this area was devoted primarily to cattle raising, but like most of the towns in the West the increased use of irrigation coupled with better farming methods has caused a gradual change in the economic structure so that today the little city is the hub of an agricultural group of communities. What might be called the metropolitan area of Scottsbluff has a population of about 17,000 people.

Centered at Scottsbluff are the activities of Terry Carpenter who had developed a successful oil business over a period of years. A few years ago Mr. Carpenter sensed the possibilities in the sand and gravel, ready-mixed concrete, and concrete block business, and to coordinate these enterprises for more efficient service he completed in 1946 the assembly of three separate units, all ultra modern and embodying the latest and most efficient types of machines as well as processing techniques, be it sand and gravel, ready-mixed concrete, or concrete block.

By designing his operation to include these three major businesses he has been able to gain sufficient output in this sparsely settled area to enable the company to operate on an efficient and sound basis. This trend to a well rounded assembly of rock product industries under one management is quite apparent in the sections west of Omaha, Nebr., for by so doing an operator has enough irons in the fire to make the entire venture profitable to him and to better suit the construction needs of the community. Mr. Carpenter has developed this trend to possibly a higher degree than most operators for he has left no gaps in his production methods; it's all-inclusive from the pit to the job with intense laboratory control in between.

As an example; how many concrete block manufacturers have a block testing machine capable of making compressive strength tests up to 300,000-lb. capacity so that each day a specified number of blocks from each of the new Jackson and Church high-pressure steam curing kilns can be tested right at the plant and the block sold on the basis of strength and quality? Similarly, how many ready-mixed concrete manufacturers can test their own cylinders without waiting for a laboratory to mail a delayed report, and sell the product strictly on the basis of quality and service? Mr. Carpenter said that inasmuch as he was new at the business he first visited many plants to get ideas and methods, but after seeing many operations that passed as plants he decided to build his "by the book." In other words, Mr. Carpenter designed his plants not so much as others had done before him, but as they should be.

To the left, above, stationary screen to receive pumped material from dredge and thence into scrubber before passing to screening plant. One of the sand drags can be seen to the left, feeding first stacker belt

Batching plant for ready mixed concrete with concrete products plant, below. Note high pressure steel autoclaves, to the left, for rapid curing of block

When we arrived at Scottsbluff we turned to the local telephone directory to get the street address of the company. Here is what met the eye:

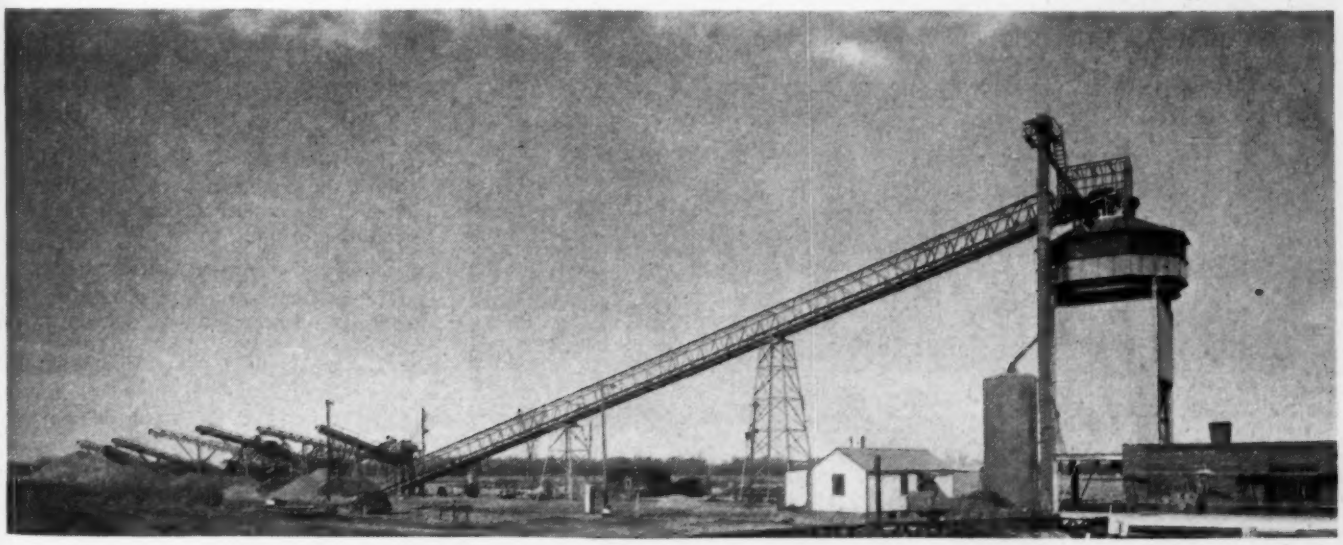
"Terry Carpenter, Ltd. Ready mix delivered in Jaeger 3½-cu. yd. mixers. Concrete sold on any 28 day strength slump desired. Sand and gravel washed and scrubbed. Moisture corrected. Each size individually weighed. No separation of aggregate or setting up of concrete. Deliveries made anywhere within 50 miles of Scottsbluff or Gering, Nebr."

All concrete, be it for block or the ready mix sales, includes Pozzolith as a cement dispersing agent. The use of Pozzolith in ready-mixed concrete is well-established, but the introduction of this reagent for concrete block manufacture is of more recent application and this company's experience should be of particular interest. For example, at this operation the use of Pozzolith in combination with a 8-hr. high-pressure curing cycle (up to 150 lb. steam pressure) permits the production of thirty-five 8- x 8- x 16-in. block per sack of cement. The block immediately after coming from the high-pressure curing autoclaves develops a compressive strength of 2000-2500 p.s.i. It is also claimed that absorption in the block is reduced less than 6 per cent, and what is important to many buyers, the block present a clean, uniform and smooth surface. The block all seem to have a very pleasing sheen not noticeable in most block. Movement is less than 1/20-in. per lin. 100-ft. Block must be held 5 hr. before 8 hr. curing cycle starts.

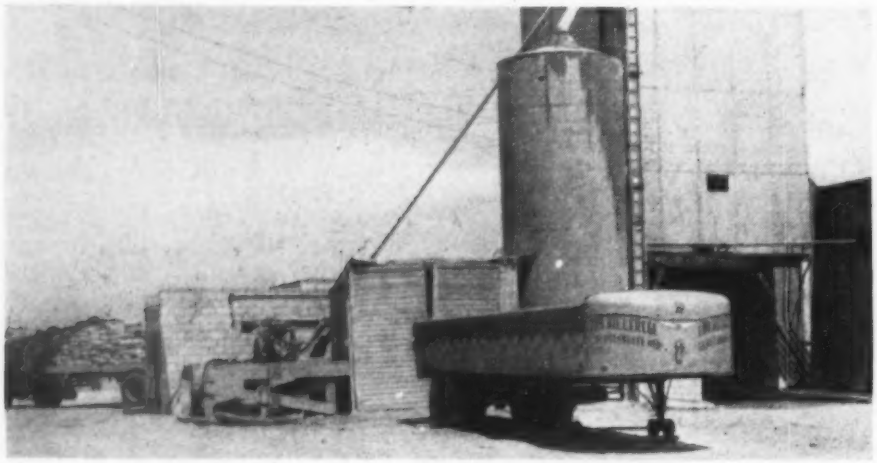
As the sands are deficient in fines, a concrete mix has been designed with Pozzolith that works well for block manufacture. In this instance, the dispersing agent serves as a lubricant and the lack of fines is offset by the dispersed particles of cement and the entrained air. Pozzolith also is responsible for the white color of the block. Without Pozzolith the block is grey.

Sand and Gravel Dredging

With this group of coordinated rock products industries, the production of the aggregate is the first step. Gravel in the area contiguous to the North Platte river is of relatively small size and with an excess of sand. As the ground water level is shallow, it lent itself in an ideal manner to the use of a suction dredge. The American Manganese Steel Division of the American Brake Shoe Co. of Chicago Heights, Ill., (designed by Bradley Carr, personally), and built a dredge for the company with a capacity of 135 t.p.h. The dredge employs a 10-in. Amsco counter-flow pump, having a 12-in. suction and a 10-in. discharge, the pump being driven through "V" belts by two D-13000 Caterpillar Diesel engines. A third D-13000 Caterpillar Diesel operates a 75-k.w. generating unit which supplies power for the 3-drum American hoists, priming pump, etc. A 50-ft. Swintek digging ladder is used. The dredge equipment



Stacker belt conveyors, to the extreme left, stockpiling four sizes of gravel and two sizes of sand. Below the stockpiles is a reclaiming belt conveyor which may be seen inclining up to the top of the ready mixed concrete batching plant



One of the bulk cement semi-trailer units at plant ready to be unloaded

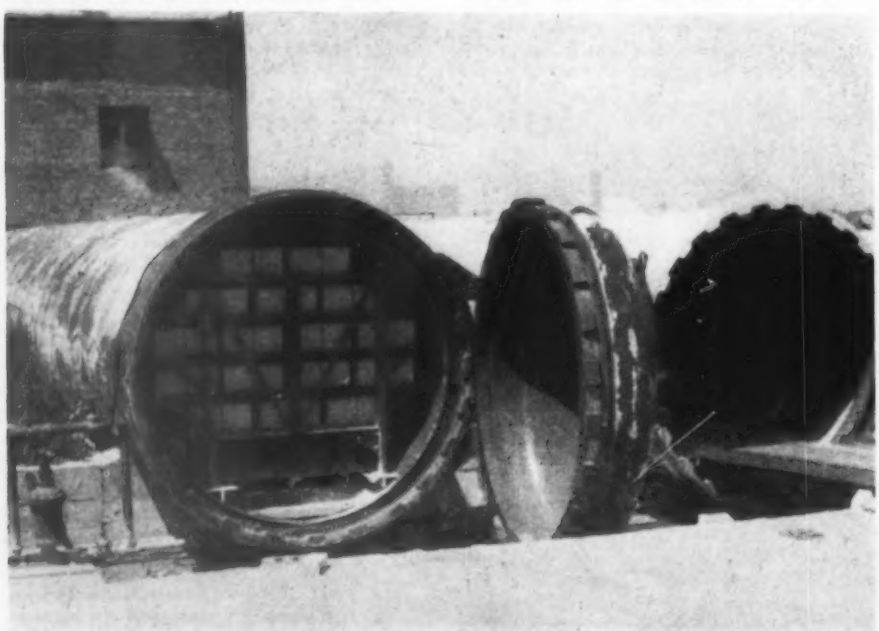
is mounted on steel hull 26- x 126-ft. with a quonset hut erected over the floating equipment. The Amsco pump delivers to the washing plant through about 500 ft. to 1500 ft. of 10-in. Naylor spiral pipe. It is a neat and efficient machine which has given complete satisfaction. The deposit requires no stripping but the company has a Caterpillar D-2 equipped with dozer, and a small Be Ge Manufacturing Co. scraper-loader for disposal of excess sands.

The second step is the sand and gravel plant, which was supplied by the Iowa Manufacturing Co., using a Kubit impact pulverizer for reduction of oversize, and six stacker belts to stockpile four sizes of gravel and two sands over the reclaiming tunnel. The plant uses a rotary scrubber and four vibrating screens and three sand drags. Material is delivered by the Amsco pump to a stationary 4- x 18-ft. primary screen that has ¼-in. square openings. Uniform flow to this screen is provided by a broad, steel stationary apron. Inasmuch as the pit produces an excess of sand, the purpose of this screen is to by-pass some of the excess and return it to areas where it can be reclaimed if desired. The off-bearing launder is of circular cross section, and in the bottom (and at right angles to it) a 6-in. dia. take-off pipe has been welded permitting a portion of this sand to be diverted to the second sand drag where plaster sand is produced. The overflow from the second drag passes to the third drag where a mason's sand can be produced if desired, but at the time of inspection the sand from both drags dropped to a short belt serving the stacker belt. This arrangement was an after-thought and according to H. D. Ellis, general superintendent, has produced a very satisfactory plaster and mason's sand. "The trade eats it up," he says. The sand drags which are all 5-ft. wide and roughly 20 ft. long, were supplied by the Iowa Manufacturing Co.

Oversize from the stationary screen flows to a 6- x 12-ft. rotary scrubber, and the last 30-in. end section of this scrubber has half its peripheral area provided with ¼-in. round perforations with the other half blanked off with steel plate. This is to cut down on the amount of coarser sands going to the No. 1 sand drag that produces the concrete sand.

The oversize from the scrubber is split equally between two 42-in. x 10-ft. Cedarapids wet-operated, triple-deck vibrating screens. The decks have 1½-in., ⅜-in., and ⅛-in. slotted wire cloth, respectively, starting with the top deck. These screens act as de-sanders, washing and rinsing screens, and the oversize (material mostly in the plus 1½-in. range but at times some 5-in. material) goes to a Kubit Impact pulverizer which reduces the oversize to 1½-in. The breaker plates in the unit have been in place since the start of operations almost one year ago. The pulverizer is driven through 6 "B" Gates Uneco "V" belts by a 30-hp. Louis-Allis Co. splash proof motor. The impact pulverizer discharges to two 18-in. conveyor belts with the product going back to the primary bank of two vibrating screens, thereby operating in closed circuit with the screens. Oversize from the two lower decks join and pass to a belt conveyor that serves a 42-in. x 10-ft., two-deck, dry-operated Iowa Vibrating screen. The top deck has ½-in. wire cloth, and the lower deck ¼-in. Minus ¼-in. plus ⅛-in. material passes to a stacker belt for ground storage. The minus ½-in., plus ¼-in. material, likewise passes to another stacker belt that delivers to ground storage over the reclaiming tunnel. The oversize from the top deck (plus ½-in., minus 1½-in.) falls to an 18-in. inclined belt conveyor, and is delivered to a 42-in. x 10-ft. single-deck, dry vibrating screen, and the two products from this screen fall to individual stacker belts. The screen has ¾-in. wire cloth and hence produces the plus ½-in., minus ¾-in., gravel and the plus ¾-in., minus 1½-in.

Returning now to the two primary vibrating screens; the fines through the lower deck (18-in. slotted wire) join the fines from the ¼-in. scrubber jacket and flow to No. 1 sand drag where the concrete sand is produced. This sand goes to its stacker belt for ground storage.



Completely filled high-pressure steam curing autoclaves. Note specially designed racks to fit cylindrical contour of interior

Ready Mixed Concrete

The second unit is the ready mix plant. Aggregates are delivered from the ground storage pile to the ready-mixed concrete plant by a horizontal reclaiming belt, 205 ft. long. The gates are of the gravity type. This belt delivers to an inclined conveyor belt, 272 ft. centers, serving six steel bins of 350 tons capacity. The bins supply the C. S. Johnson Co. batcher which in turn is designed to deliver either to the 50-cu. ft. Besser mixer serving the block plant or to the 2-cu. yd. T. L.

Smith tilting concrete mixer. Dry aggregates can also be diverted through this section of the plant direct to trucks. The company now uses two Jaeger mixer trucks mounted on International chassis. These mixers are 3½ and 4 yd. capacity. Three Dumpcrete units for hauling concrete also are used. The operating platform for the Johnson batcher is just above the truck passageway with an arrangement of extended lever handles to the various aggregate bins. Kron scales are used for the aggregate and bulk cement. The latter is delivered to the plant in trucks and elevated via bucket elevator to storage.

Alongside the ready-mixed concrete plant is a warehouse for storage of sacked materials; portland cement, cement coloring material, Pozzolith and other items. Experiments are in progress, using finely ground cement-rock dust as an admixture in the concrete. The sacked material is delivered to the plant by trucks. All sacked material in the warehouse can be delivered to the concrete mixer section by a specially designed inclined belt conveyor that operates at a steep angle. Also located in this area is the testing laboratory that features the 150-ton capacity Baldwin compressive strength testing machine as well as other smaller laboratory items for testing aggregate and concrete.

Concrete Block Plant

On the opposite side of the ready-mixed concrete plant next to the warehouse and laboratory section is the modern block plant using a Besser Super-Vibrapac machine. Green block are delivered by lift trucks to one of the three Jackson & Church high pressure curing kilns. These are of heavy cast steel construction capable of withstanding 150 lb. steam pressure. The kilns, which are 80 ft. long and 6-ft. 6-in. in diameter, each hold 14 racks of the 8- x 8- x 16-in. blocks. Racks are of special design to conform to the circular dimensions of the kilns. The green blocks are first allowed to preset (initial set) before being subjected to steam pressure as it has been found that by so doing all hair cracking is eliminated. This pre-setting period, from 5 hrs. to 6 hrs. is within the entire cycle (including steaming) of 10 hours. Both end doors of the pressure kilns are provided with safety devices so that all pressure within is eliminated before the doors are opened.

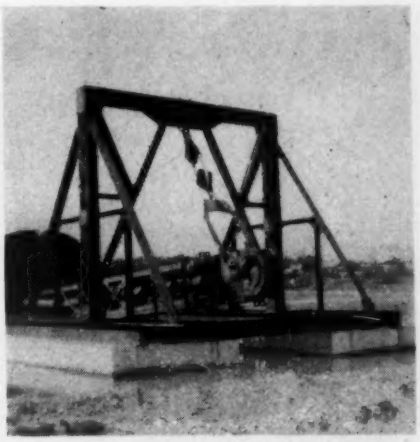
Steam for the pressure kilns is supplied by an Erie City Iron Works, Type VL boiler having a heating surface for the boiler of 1702 sq. ft. and 318 sq. ft. for the water walls. It operates at 160 lb. maximum pressure and has a Babcock and Wilson oil-gas burner.

Water for the entire plant comes from a 6-in. Pomona deep-well pump installed in the boiler room, the pump being powered by a 50-hp. G. E. motor. The well is 32-ft. deep. Water is pumped to a horizontal 8- x 16-ft. steel pressure tank provided with the Automatic Control Company's devices for automatically controlling the water pressure to plant and boiler.

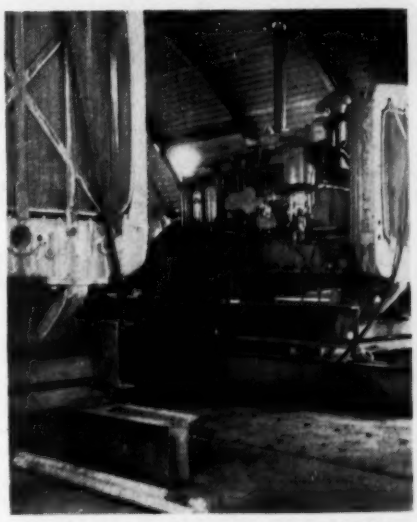
For handling block into and out of the kiln, the company has five lift trucks; two Clark forked type, two Automatic Transporters, and one Salsbury unit. The entire storage yard for block is paved, but only a small inventory is on hand as sales about keep up with production which has stabilized at 4000 of the 8's per day.

The entire plant, including the dredge, obtains electric power from three D-13000 Caterpillar-electric units, each unit developing 75-kw. These three units, mounted in the boiler room, are a neat and efficient installation. This gives the operation a total of six such Diesel units with an investment of $600,000.

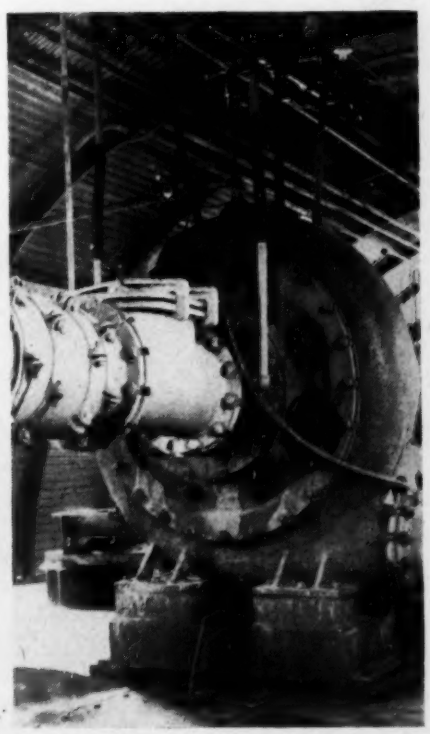
Terry Carpenter, Ltd., operates as a limited partnership and is totally owned by Mr. Carpenter and his family. K. H. Datel is office manager.



Close-up of dredge cutter



Two of the Diesel power units on dredge



Dredge pump, looking toward 10-in. discharge line with 12-in. suction line below

Dredge may be seen to the left, and to the right is scrubber with launder emptying back into lake

Haulage unit being dumped to primary crusher hopper. Note continuous ramp which eliminates turning of trucks

John W. Karch Stone Co., Celina, Ohio, has moved the primary crusher to the quarry floor, set up an intermediate surge storage pile, and changed haulage system to large tractor-semi-trailers

By DAVID MOCINE

From Lime Burning to MODERN STONE PLANT

PLANT MODERNIZATION from shovel to final storage for the production of crushed stone, now being carried out by the John W. Karch Stone Co., Celina, Ohio, will produce a streamlined plant that would cause the founders of the original plant for burning lime to stare in amazement, were they able to come on the scene today.

Quarry Operations

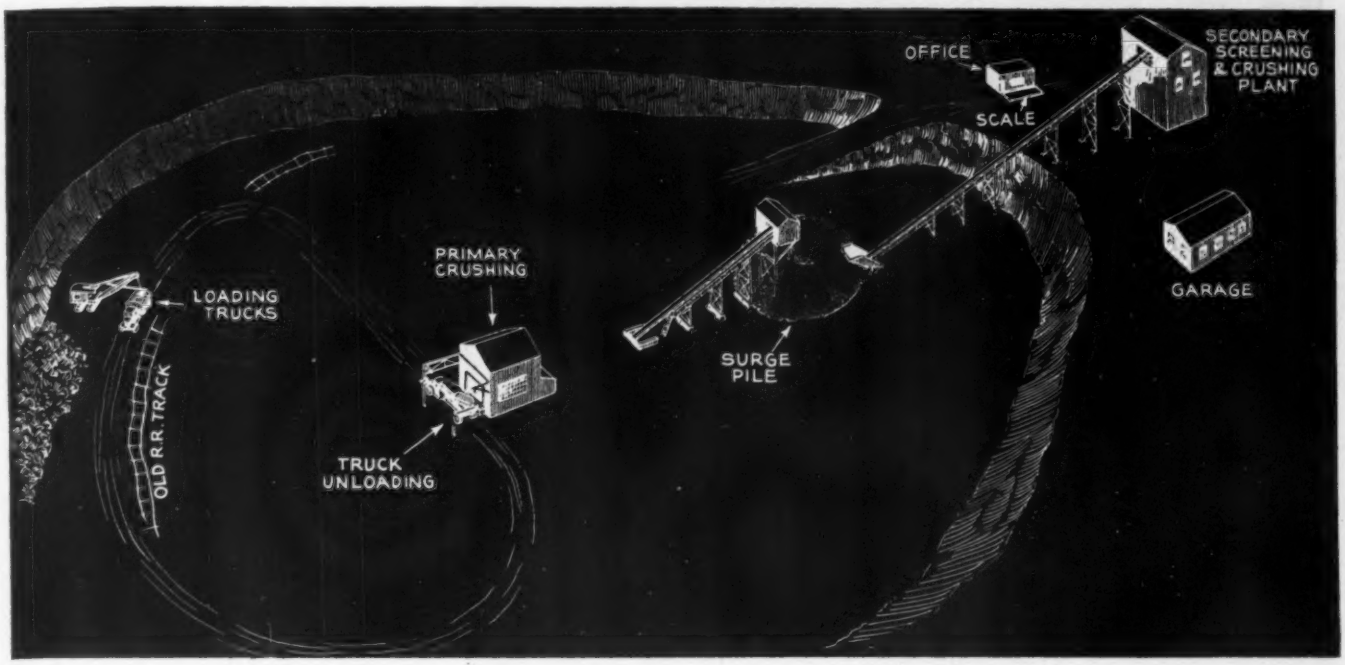
In keeping with the modern trend, the primary crusher is being located on the quarry floor with a conveyor system to move the crushed product to the plant—a far cry from pulling individual quarry cars up the incline to the plant on the ground level. The reinforced concrete building to house the secondary crushing and screening equipment, a building constructed 40 years ago, is the only part of the old plant layout which is not being drastically changed.

First opened for lime burning in 1880, the operation was changed over to a crushed stone plant in 1900 when the quarry was bought by John W. Karch, father of George and Paul, the present operators. An old wood-fired lime kiln still may be seen under a heavy growth of trees on one corner of the property. John W. Karch Stone Co. has 487 acres available for exploitation with the present quarry claiming only about 32 acres, and although the modernization, coupled with new and larger equipment, will nearly double the capacity of the plant, this acreage leaves many years of profitable operation.

A new Loomis Model 44 gasoline-powered traction crawler blast hole drill has been placed in operation in the quarry, spacing 45-ft. deep holes about 18 ft. apart and with a 12 ft. burden. Blasts are fired by delayed action electric caps, using about 230 lbs. of 40 or 60 per cent gelatine dynamite. The nature of stone in this quarry almost precludes the necessity for secondary blasting. A Davey 105-cu. ft. portable compressor mounted on a 1½-ton Ford truck, and two Ingersoll-Rand JA-45 drills will handle all the secondary blasting preparation. The large-opening primary crusher (36- x 48-in. jaw) has been installed to further aid in cutting down secondary blasting.

For the increased production a crawler-type 1½-cu. yd. Lima "604" air-controlled (operating levers) shov-

Primary crusher station, left; first conveyor elevating for discharge to surge pile, center; and reclaiming tunnel for second conveyor, elevating minus 4-in. material, extreme right



Quarry layout showing location of primary crusher, surge pile, and secondary crushing and screening plant, above

el, powered by a Cummins supercharged Diesel was selected. This shovel will keep two 10-cu. yd. Easton semi-trailer units busy with only a short haul to the primary crusher station. The two Easton TR-10 trailers are powered by White WA-26 tractors.

The primary crushing station is located in the middle of the quarry floor, allowing the semi-trailer trucks to drive up along side the crusher hopper, the trailers being side-dumped by an Easton hoist. After dumping, the semi-trailer units continue on out the far side (see illustration), the entire operation taking perhaps 30 seconds.

Crushing and Screening

From the primary surge hopper the stone will be fed by a Jeffrey-Traylor 4- x 10-ft. feeder to a 36- x 48-in. Nordberg jaw crusher. This crusher will take stone to a maximum of 30 to 40 in., with a capacity of 135 t.p.h. at 4 in. opening. Powered by a 125-hp. slip ring motor with reversing drum control starter, the crusher discharges to a 30-in. belt, 275-ft. centers. This conveyor elevates the minus 4-in. material for discharge to a surge pile over a reclaiming tunnel. From the reclaiming tunnel a 30 in. conveyor, 300 ft. centers, elevates the stone 65 ft. to the secondary crushing and screening plant in the building previously mentioned.

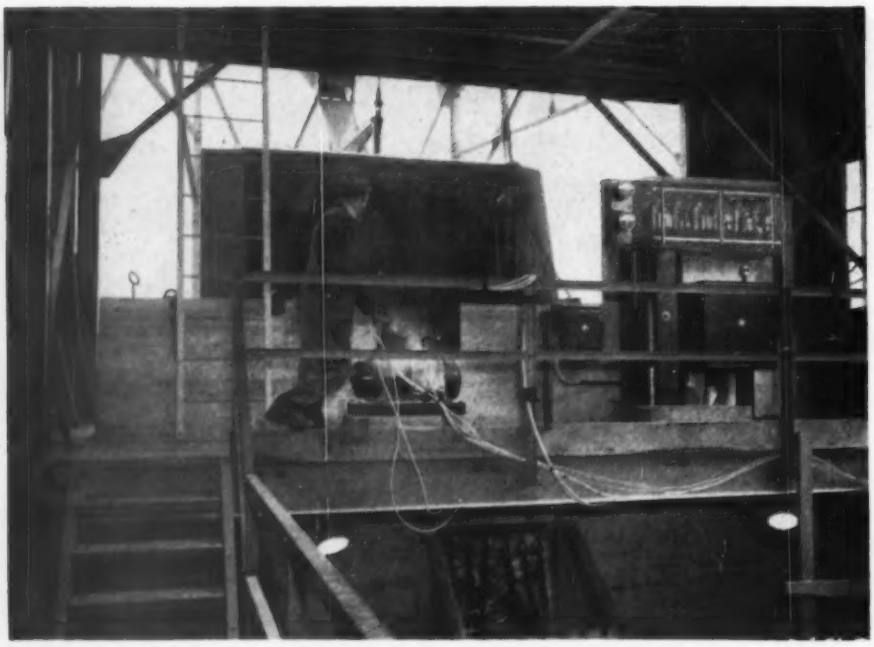
All steel structures for the primary crusher station, including the framework for the trailer side-dump hoist; the supports for the two conveyor belts (from the primary crusher to the surge pile and from the surge pile to the secondary crushing building), were furnished, fabricated and erected by the Indiana Bridge Co., Muncie, Ind.

From the conveyor, the material will be discharged to a surge bin of 50-ton capacity from which it is reclaimed by a 3- x 6-ft. Jeffrey-Traylor scalping feeder (3-ft. feeder, 3-ft. scalping screen).

Material from the scalping feeder is chuted to a 4-ft. Symons cone crusher with 120 t.p.h. capacity at 1-in. opening, powered by a 100-hp. motor. Discharge from this secondary crusher is chuted to a bucket elevator, 55 ft. centers, from which it is discharged over a 4- x 10-ft. Symons double-deck screen. Mesh on the top deck of the screen is in size of opening up to 4 in., dependent upon requirements, and the lower deck normally carries a 3/16-in. opening. Throughs from the second deck of the screen are chuted to a 3- x 5-ft. Tyler Hum-mer single-deck screen, where agricultural limestone is produced by dry screening. Oversize from this screen is chuted to a 25-ton surge bin from which it may be reclaimed by the same 30-ft. bucket elevator and returned to the double-deck screen. Agricultural limestone is stored in a concrete storage bin.

Oversize from the first deck of the double-deck screen is chuted to a second Symons crusher (3-ft. short head with 50 t.p.h. capacity at ½-in. opening) powered by a 75 hp. motor. This crusher is alongside the secondary crusher and discharges to a bucket elevator, 30-ft. centers, which elevates the material to a 4- x 5-ft. Hum-mer

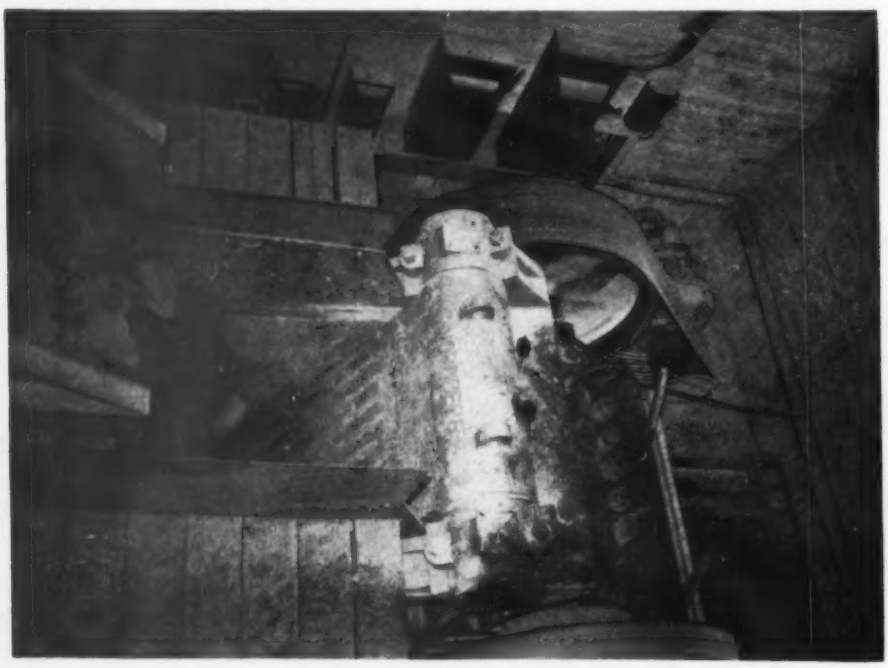
Loading 10-cu. yd. haulage unit in quarry with 1½-cu. yd. shovel



Controls and motive unit for dumping quarry haulage unit. Below is the feeder to primary crusher

double-deck screen with the top deck carrying 1½-in. mesh, oversize going to stockpile as finished product. The second deck carries variable mesh sizes (to as low as ½-in.). Oversize from this deck is stockpiled as finished material. Throughs from the second deck are conveyed to a 4- x 5-ft. Hummer single-deck screen with ⅛-in. mesh screen openings. Oversize from this screen is stockpiled as a finished product and throughs go to a flat 4- x 12-ft. shaker screen, constructed by the Karch Bros. with wedge wire mesh (minus ⅛-in. opening). The principal function of this screen is the dewatering of stone sand (throughs from this screen fall to a settling tank where they are recovered with a flight conveyor for mixture with the oversize. This system controls the gradation of manufactured sand). Oversize from the second deck of the F screen is chuted to a 4- x 6-ft. type 60 Hummer washing screen, with mesh varying from 3 in. to 3/16 in. before being discharged to stockpile. A 2½-in. Frederick pump driven by a 40 hp. Lima motor supplies wash water. Two pumps are used for quarry drainage, a Gorman-Rupp self-priming pump driven by a 30 hp. Lima motor and a 5-in. Frederick powered by a 30 hp. Westinghouse.

Immediately along side the plant is a county road, but it is contemplated utilizing the four acres on the other side for stockpiling finished material when some suitable means of conveyance across the road has been found. The abandoned quarry train (engine, cars and trackage) will be transferred, as needed, to the company's second operation in Indiana where a quarry train is still in operation. It is expected that this revamping of the entire operation will cause the plant about six weeks of down time.



Primary jaw crusher receives a controlled feed from hopper

Pacific Coast Conference

AMERICAN INSTITUTE OF MINING and Metallurgical Engineers will hold a series of conferences in San Francisco, Calif., October 21 through 25, at the Civic Auditorium. Papers on widely divergent fields of the nonmetalic ore industry as relating to the Pacific coast will be presented by authorities on the subject under discussion. This meeting will run concurrently with the Pacific Chemical Exposition.

LEON D. COLLINS, Pacific Coast Aggregates, Inc., will discuss the relation of gravel deposits to industry in California; Clarence King, California State Division of Mines, will speak on pumice and perlite deposits in the state and C. A. Logan, also of the State Division of Mines, will present a paper on the most important and more accessible limestone outcrops in the area. A paper will be given by Louis Morretti, president, Industrial Minerals and Chemical Co., Berkeley, concerning non-metallic minerals used in the insecticide industry.

D. S. SEE, Leslie Salt Co., Newark, Calif., will speak on the salt industry; R. J. Anderson, editor, Raw Materials Survey, Inc., will discuss recent developments in mineral and raw material in the non-metallic field in the western states; Ben M. Page, professor, Standard University, will present a paper stressing the importance of Talc deposits in Inyo County.

Royal E. Fowle, California civil engineer, will give an illustrated talk on the quarrying and crushing of granite rock; L. A. Parsons, Calaveras Cement Co., will speak on calaveras limestone and W. F. Dietrich, Dietrich, Morse & Associates and owner of Campo del Mar Pottery, will address the group on California's refractory clays.

Wyoming Glass Sand

POSSIBILITIES of glass sand deposits near Superior, Wyo., should be investigated as a source of supply for the western glass industry, according to a report by Dr. H. C. Fisk, Natural Resources Research Institute director at the University of Wyoming. He pointed out that Denver, Colo., is now getting its glass sand from east of the Mississippi river. Beneficiation by washing and acid treatment are all that is needed, he pointed out.

Pennsylvania Stone Producers Annual Outing

THE PENNSYLVANIA STONE PRODUCERS ASSOCIATION, INC., and the Agricultural Limestone Division held their annual outing and picnic at the Harrisburg Sportsman's Club at Harrisburg, Penn., on Thursday, August 14, 1947. Even though the meeting was held on one of the summer's hottest and stickiest days, it was well attended with about 400 producers and manufacturers' representatives present. To anyone who has attended one of these outings it will be unnecessary to say that all had a most excellent time, for that is always an understatement and this meeting was no exception.

The morning business session was brief and due to the hot weather was held in a shaded portion of the grounds. E. L. Schmidt, chief engineer of the Pennsylvania Department of Highways, spoke briefly on the present and future highway construction program of the state. He pointed out that the state had 41,000 miles of paved highways, and had devoted much of its assets in the past to county and state needs but that congestion in the two major Pennsylvania cities (Pittsburgh and Philadelphia) made it imperative that these cities be provided with better and modern highway facilities, but due to the extreme high cost of such improvements something different in the way of highway financing would have to be brought into being. He pointed out that the state will have a revenue for 1947 of about $230,000,000, of which $146,000,000 would be from gasoline tax, but of this total income, only $73,000,000 would be available for new construction, maintenance and improvements and that this amount would only build a very modest amount of city highway improvements.

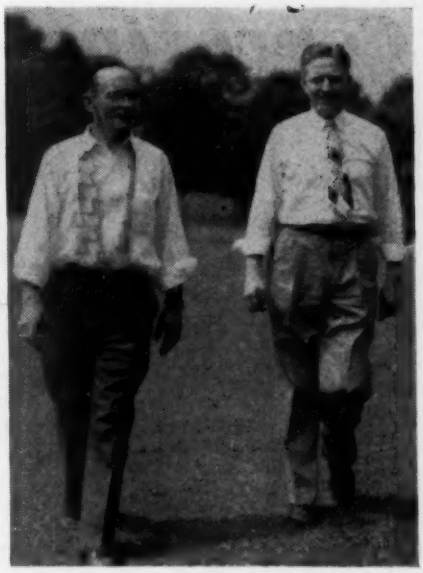
Following Mr. Smidth, Warren K. Myers, chief maintenance engineer and William Warrick, construction engineer, both of the Pennsylvania Department of Highways, gave brief comments along the same line. George G. Dorsey, Regional Director of the Wage and Hour Division of the U. S. Department of Labor, was slated to give a talk but car trouble prevented his attendence until too late in the day.

Otho M. Graves, of the General Crushed Stone Co., was called upon to make any comments, and introduced Oscar E. Benson, the new assistant to the president of General Crushed Stone Co., and Irving H. Boggs, who is again with that company.

During the afternoon those interested in golf had their day with others playing cards, bingo, etc. Prizes were awarded just before dinner. Immediately after the evening meal floor show entertainment was provided.

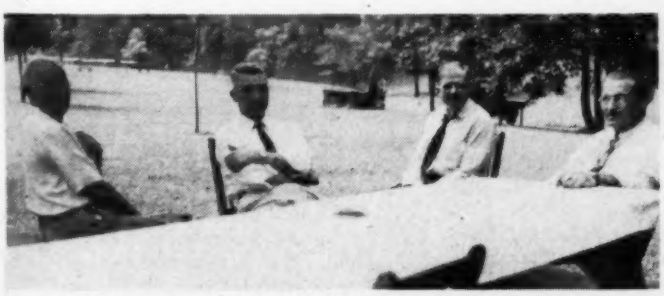
Both lunch and dinner were served on the lawn of the club. H. H. Wagner, general manager of the Pennsylvania Stone Producers Association, Inc., and his staff can be complimented for their part in the day's entertainment.

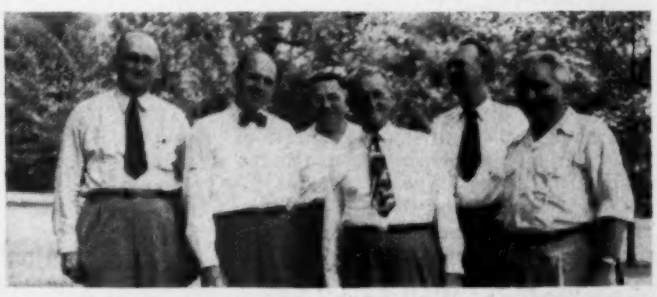
Officers of the Pennsylvania Stone Producers Association include: John Curtin, Sr., president; T. C. McPoyle, vice-president; Ellwood Gilbert, treasurer; Walter H. Fehr, secretary; and H. H. Wagner, general manager.



W. H. Lytteer, and J. F. Coleman, with General Crushed Stone Co.

Oscar E. Benson, left, new assistant to president, General Crushed Stone Co., and Irving H. Boggs, who is again with this company





Photos—Courtesy Constructioneer

Above, left: Jos. McGleen, Union Paving Co.; Herb Allen, General Crushed Stone Co.; S. H. Bell, Pittsburgh Limestone Co.; and C. L. Corson, G. & W. H. Corson, Inc. Above, right: W. A. Warrick, chief construction engineer, and Warren K. Myers, chief maintenance engineer, Pennsylvania State Department of Highways; H. H. Wagner, general manager of Pennsylvania Stone Producers, Inc.; E. L. Schmidt, chief engineer of the state highway department; Otho A. Graves, General Crushed Stone Co.; and T. C. McPoyle, John T. Dyer Quarry Co. Below, left: J. R. Chamberlain, Norristown; Nicholas Cascetti, Philadelphia; and Geo. Kibblehouse, Kibblehouse Quarries, Ambler, Penn. Below, right: Geo. E. Schaefer, General Crushed Stone Co.; A. T. Goldbeck, National Crushed Stone Association; and Ed Weymuth, Pittsburgh Limestone Co.

Plant as viewed from above. Washing unit is over steel silos, screening unit at the left is partially obscured by dust

Recover Three Grades of Sand In One Operation

Griffith Co., Bakersfield, Calif., constructs new sand and gravel plant to serve big highway contract. Extensive system of conveyors cuts intra-plant haulage cost

By W. B. LENHART

TO SUPPLY its numerous highway contracts in the Bakersfield, Calif., area, the Griffith Company, well-known highway contractors, with main offices in Los Angeles, constructed a new sand, gravel and crushed rock plant as well as a black top unit near Bakersfield. While no special effort is made to sell commercial stone, this company does market some sizes greatly in demand in the section or sizes that the new plant produces over and above its own needs. Recently the company was awarded a $1,210,000 road job involving improvements to that portion of highway No. 99 from "The Circle" in Bakersfield to Snow road. This is the largest single highway contract ever let in Kern County. This job, and other contracts, will keep the plant busy for some time to come.

Produce "Well Rock"

One of the products this company prepares for commercial use is "Well Rock." Some of the areas contiguous to Bakersfield are excellent farm land but it is necessary in many cases to resort to irrigation from wells. Wells, in some instances 1000 to 1200 ft. deep, are drilled with oil well rotary equipment. These rigs drill a hole from 24-in. to 28-in. in diameter, and a 12- to 14-in. casing is then placed in the opening and the space around the casing filled with "well rock." This is an all-gravel product from ¾-in. maximum to ¼-in. minimum. It is scarce in the area and much in demand. These sizes, it was said, gave the best results, allowing water to flow freely through the mass with a minimum of sand infiltration. The best wells in the area can produce 2500 gal. per min., but many are in the 1400 to 2000 gal. per min. class. Water levels are usually in the minus 40-ft. range with the pull-down being about to the 200 ft. horizon.

Designed for maximum flexibility, the plant uses belt conveyors throughout. Four sizes of crushed rock are prepared in the dry section as well as a dry sand and a dry crusher dust. The first five aggregates are all stacked by individual stacker belt conveyors that finger out over a reclaiming tunnel. All these aggregates are for the normal use in the new hot plant although trucks can be loaded from the reclaiming system if so desired. In addition to the dry crushed stone section, the plant produces four sizes of washed gravel (3-in., 1½-in., ¾-in., and ¼-in.) and two grades of sand; concrete and plaster sand. The plant was designed cooperatively by the Conveyor Co. of Los Angeles and George Cole, plant superintendent. The Conveyor Co. centered its effort on the dry crushing and screening and conveying section, and Mr. Cole concentrated on the washed gravel and sand section.

Unusual Sand Washers

The sand washers should be of particular interest. They were designed and patented by Geo. W. Cole, and are called the Cole rotary sand classifier. Three grades of sand can be made simultaneously with this washer; a coarse, medium, and plaster sand, but at this operation the two first mentioned sizes are mixed on the stacker belt to produce the one grade of concrete sand. The device consists of an inclined wheel, 84-in. in diameter, to which are welded 15 open-sided cups. This wheel turns at the rate of 2½ revolutions per minute. There are three of these wheels all mounted in a row and all in the same pulp box. Flow of pulp is admitted to one end where settling conditions are such that the larger particles only settle out. The middle wheel takes out the next size and the third wheel the plaster sand.

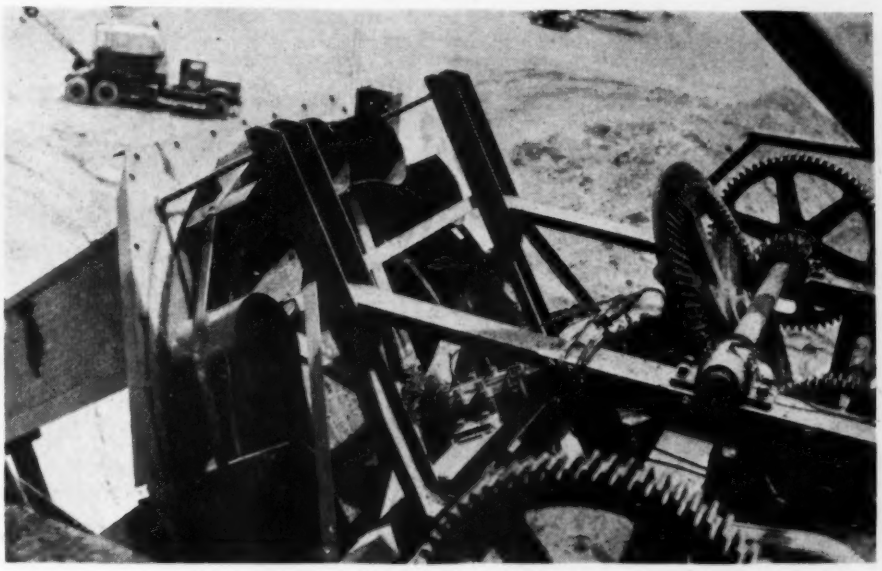
By raising and lowering a weir on the pulp box in which the three wheels operate, the velocity of the pulp through the machine can be regulated so as to control the size ratios. Each wheel uses a 5-hp. motor. The sand from the first two wheels falls to a stacker belt, and is low enough in water content that it easily rides the belt up to the discharge point. This unit has a capacity of 250 tons of sand per 8 hours. As pointed out by its designer more wheels could be added to the line-up if conditions warranted. The Griffith Company pays Mr. Cole a monthly royalty for the use of the machine and Mr. Cole may place the machine out on a royalty basis to other operators.

Dust Collection for "Hot" Plant

Another feature that may be of interest to those producers who have "hot" plants is the method developed by Griffith Company for eliminating smoke and dust. This is particularly desirable along the Pacific Coast and in the Los Angeles area where the so-called "Smog" is a serious threat to many industries as laws are now being enacted in the state to make dust and smoke elimination a real necessity. At this plant a cyclone dust collector has been installed with the intake to the collector taking off from the old stack. A 48-in. fan pulls the dust and gasses through the dust collector where the larger particles are settled out. The fan then exhausts into a steel tower, about 6-ft. in diameter and 40-ft. high. In this tower are suitable water sprays and baffles that wash out the last bit of dust from the hot plant gasses. When the hot plant is in operation only a little steam or fog issues from the stack. The entire assembly was made by the company's staff from miscellaneous items secured from nearby oil refineries. The products obtained from the cyclone dust collector can be returned to the hot mix or can be loaded to dump trucks for further disposal. The dust from the spray tower runs to waste.

Sand and Gravel Plant

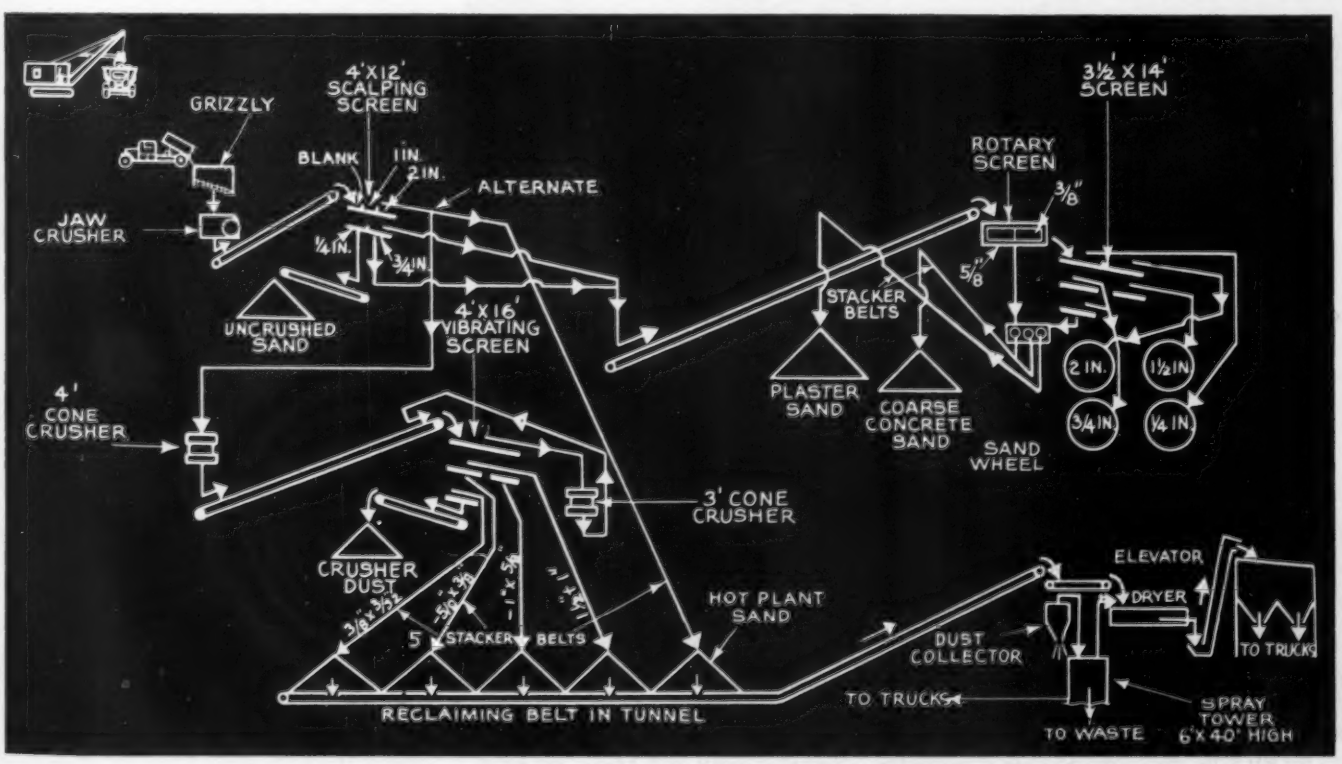
Located northeast of Bakersfield close to the China Grade Loop road and on the north banks of the Kern river is the new plant which draws materials from two deposits, one immediately alongside the plant and a second about 3 miles further up the Kern river. Either pit can produce aggregates that will pass the state highway specifications. The plant has been in operation less than a year. At one time it was producing aggregate for the company's concrete needs (as well as other uses) which were considerable for the company was pouring 1000 cu. yd. of concrete per day. The plant has a rated capacity of 1000 tons per 8 hours, but with the large ground storage available it can take care of a considerable surge over a long period of time if necessary. While these peak production periods were occurring, or at any time for that matter, no rock or stone was ever rejected.



One of three sand washing wheels which are known as rotary sand classifiers. Three grades of sand are made with each classifier

Water Recovery from Old Oil Wells

While the plant is alongside the Kern river, water for plant use is quite a problem. Sinking wells has not proven satisfactory and when getting water from the Kern river, the question of water rights comes up so the management, not wishing to get entangled with any prospective customers, has solved the water problem in a novel manner. Immediately adjacent to the plant are many old oil wells that have long ago ceased to flow, and what production they now deliver is all by pumping. The production of oil (per well) is so low and



Plant flowsheet showing the unusually large live storage capacity for blending any desired combination of sizes

Wet section of plant showing large capacity steel storage silos arranged for ample headroom

Main conveyor belt from truck hopper scalper

the water pumped with the oil is so large that the oil companies have evolved a system of pumping their entire output (water and oil) into canals and settling areas from which the oil is eventually recovered. The water still contains some oil sludge that normally runs to waste, but the Griffith Co., under the direction of T. C. Latham, district manager, runs this water into five settling ponds operating in series, the water from one pond cascading into the next. The fresh water outlet of each pond is well below the water line so that no floating oil leaves the pond. Floating oil is drained off through a higher pipe outlet at water line. Thus each pond removes its quota of oil until the fifth and final pond is free from all traces of oil. The four upper ponds are about 40- x 60-ft. in area and the lowest pond is about 60- x 100-ft. The water from the lower pond flows through an 8-in. steel pipe that acts as the suction line to a 6-in. Byron-Jackson centrifugal pump V-belted to a 50-hp. G. E. Motor.

Overall view of plant with truck dumping hopper to the left and plant to the right. Note wide use of belt conveyors

To the left is the stacker for reduction of segregation, clamshell in center loads hopper, and batcher may be seen to the right. Two steel silos are for bulk cement

Loading at the pit is done by a 1½-cu. yd. Lima shovel that loads to a fleet of trucks which deliver the aggregate to a truck hopper. Over this hopper is a horizontal grizzly and immediately below is a second, inclined grizzly. Fines through the second grizzly fall to the off-bearing belt and the oversize falls to a 15- x 38-in. Wheeling jaw crusher. The crushed product joins the throughs of the grizzly on a 30-in. inclined belt conveyor serving the 4- x 12-ft. two-deck Symons scalping screen. This screen operates dry. Considerable variation in the function of the scalper is practiced, however, all the oversize from the top deck (plus 2-in.) falls to a 4-ft. Symons cone crusher. If desired, a dry sand can be taken off from the upper section of the screen in which case this sand falls to a belt conveyor that angles out from the main plant and delivers the dry sand to ground storage over the reclaiming belt serving the hot plant or, if desired, larger sizes of uncrushed gravel and sand can be sent up the long inclined belt conveyor serving the washing section of the plant. There is a wide range of flexibility at this point in the operation. The oversize from the scalper, after passing the 4-ft. cone crusher, drops to an inclined belt, and is transferred to a return belt conveyor serving a 48-in. by 16-ft. dry, two-and-one-half deck Symons vibrating screen.

Here a dry crusher dust is removed and sent to a stacker belt that discharges to a portion of ground opposite the reclaiming section. This material is reclaimed by a Traxcavator mounted on a D-4 Caterpillar tractor. This same screen removes four crushed stone sizes for the hot plant: minus ⅜-in., plus 3/32-in.; minus ⅝-in., plus ⅜-in.; minus 1-in., plus ⅝-in.; and a plus 1-in. These sizes all fall to a separate stacker belt arranged like fingers, with each belt dumping its load over the reclaiming belt. The oversize from the top deck of this screen falls to a 3-ft. Symons cone crusher that discharges to an inclined belt and a transfer inclined belt, returning the crushed product to the head of the 4- x 16-ft. vibrating screen, previously mentioned. As the screen set-up at the time of inspection was designed to produce practically all minus ⅜-in., plus 3/32-in., material for the hot plant, the crushers were working to capacity on a close set. In the area the trend for rock to be used in the hot plant is for the smaller sizes; ⅜-in. and ½-in. with some ¾-in. For the base material, 1½- to 2-in. crushed rock is used.

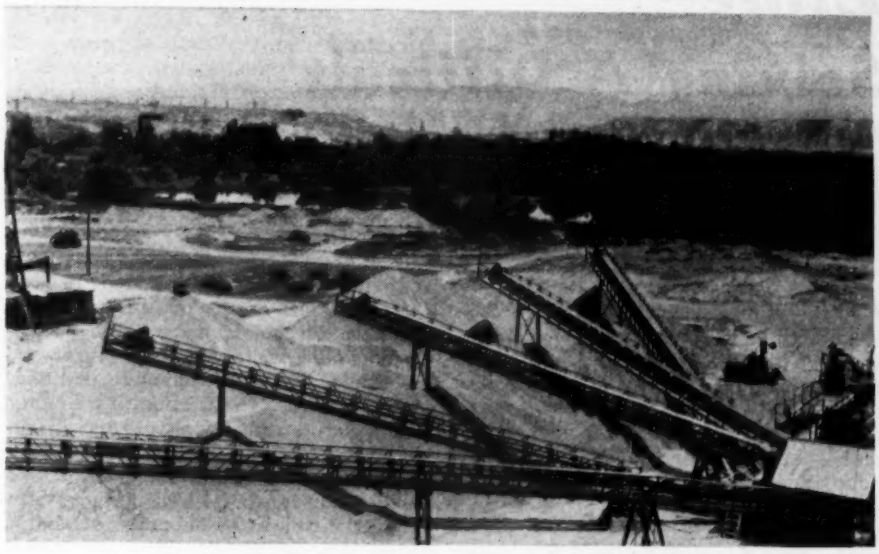
Returning to the scalper screen: When washed gravel and sand is desired, the screen set-up is changed to meet the immediate requiremnts although it is common practice to produce 3-in., 1½-in., ¾-in., and ¼-in. washed gravel and the two grades of sand. When unwashed and uncrushed material is being handled, the scalper screen product goes up a long inclined belt, 220-ft. centers, that delivers to a short, rotary screen mounted on top of four steel cylindrical bins, each bin holding 150 tons of material. The outer jacket of the screen has ⅜-in. slotted wire and the inner drum, ⅝-in. round perforated plate. The throughs from the outer jacket go to the previously mentioned Cole sand classifiers and all other sizes go to a third Symons vibrating screen. This unit has 2½ decks and operates wet. It produces the previously mentioned four sizes of uncrushed gravel. Trucks load from these bins.

Concrete Batching Plant

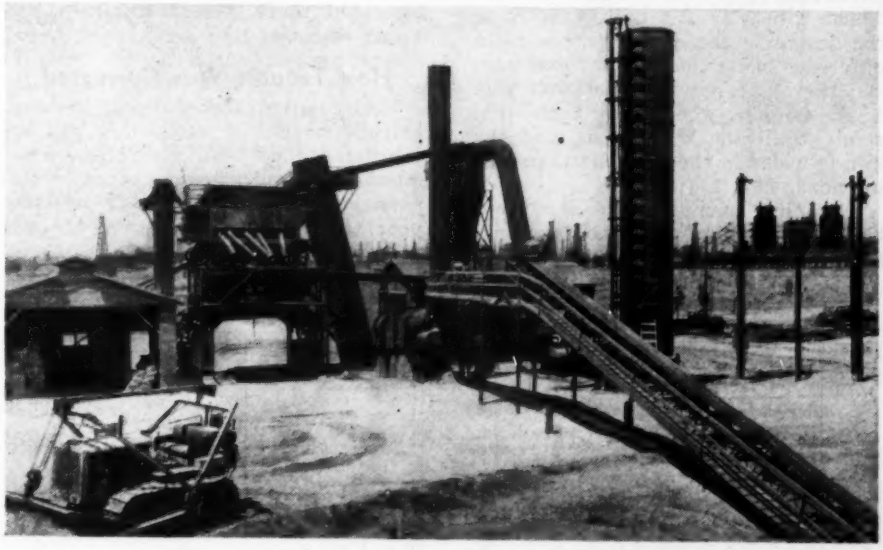
For pouring concrete for various road jobs, the Griffith Co. has one of the latest batcher models of the Conveyor Co. of Los Angeles. This installation is several miles from the sand and gravel plant, and all aggregates and bulk cement are delivered to the plant by company-owned trucks.

Highway specifications in California require that prepared aggregates be not handled any more than necessary and under no consideration are they to be moved by a tractor and dozer as this rule is considered necessary to prevent segregation. To permit having a stockpile of material at the batching plant, the company has devised a novel stacking arrange-

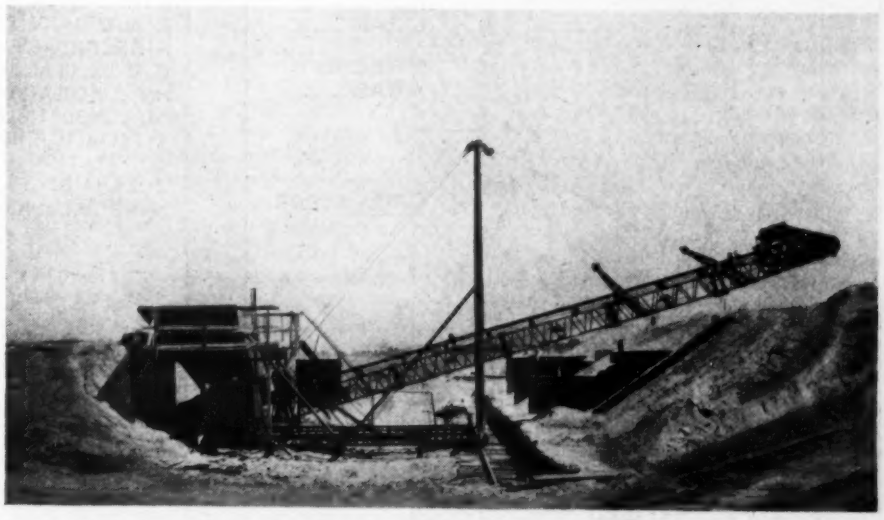
(Continued on page 128)



Stacker belt conveyors "fingering" out over reclaiming tunnel



Reclaiming belt delivers stone to the hot plant. The steel stack to the right is a scrubber tower for removing smoke and dust from hot plant



Equipment used to reduce segregation of aggregates at place of use. Trucks dump to hopper at left and all materials are stacked in separate compartments by inclined stacker belt

Solving A Difficult Lime Burning Problem

By VICTOR J. AZBE*

FOREWORD

• This discussion is based on actual incidents, dealing with essentials of proper combustion in lime kilns, emphasizing the importance of proper early mixing of air and combustible gas in the kiln rather than late. It also describes the proper hot zone section arrangement. Forced mixing through high velocity recirculating gas projection, controlled through pressure of recirculating gas as well as through its oxygen content, is discussed. Partial use of recirculating fan as kiln exhaust fan is mentioned.

AT the new Blubber Bay lime plant, the kiln is of the larger Azbe type with a hot zone area of 60 sq. ft. The kiln is fairly low, but it is continuously charged; that is, while operating normally a car discharges about every 20 minutes. Under normal operation lime is drawn every hour and a half.

The fuel is gas from a producer in which hogged wood fuel and a low-grade coal mixture is gasified. The producer is adequate for any reasonable capacity and does not present any particular problems.

The kiln was not built exactly to the design in the drawings, the main difference being that the hot zone constriction was not incorporated, Fig. 1 A (right), the walls remaining straight all the way down, and the kiln is wider in the hot zone than was intended, Fig. 1 (left).

There had been a great deal of trouble with this kiln. On some days only 25 tons of lime were made regardless of the amount of gas fed or the strength of draft maintained. The kiln would seldom hang for a proper trim as it was not often that any section of it was hot enough to hang. On many days the fuel ratio was only 2-1 when it properly should have been in excess of 4-1, with the particular quality of fuel on hand.

More or less gas, and more or less draft helped little or none, although with stronger draft, conditions were somewhat better. But strong draft was hard to maintain as the top of the kiln insisted on heating, which indicated there was burning in the upper sections.

How Trouble Was Corrected

Recirculation, forced draft; nothing helped enough to consider it as the solution to the vexing problem. Frequently, when draft was good it would persist in weakening until it was too poor to maintain combustion of any reasonable amount of fuel.

The writer was then called to the plant, making a rush trip of almost 3000 miles. On the first day at the plant no solution presented itself, but then the problem was reduced to the simplest elements. There was enough fuel fed, enough to make 80 tons of lime. There was enough draft, that is, enough air, as the analysis revealed, and a considerable amount of excess oxygen was passing out of the exhaust fan. With air and gas mixed, heat is unavoidably produced and lime made, so why should production in this case

*Azbe Corporation

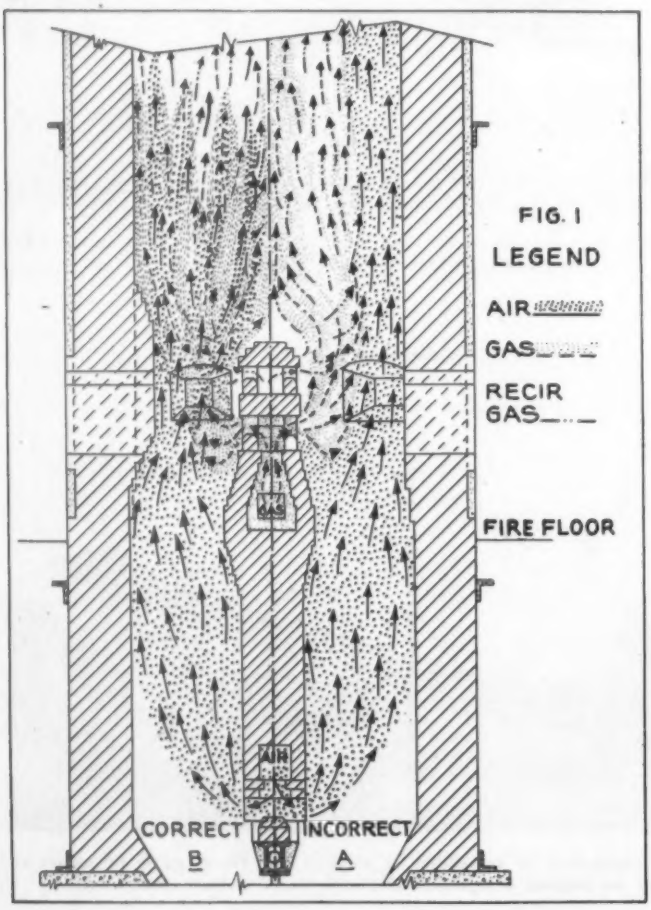


Fig. 1: Showing effect of correct and incorrect brick arrangements on hot zone mixing

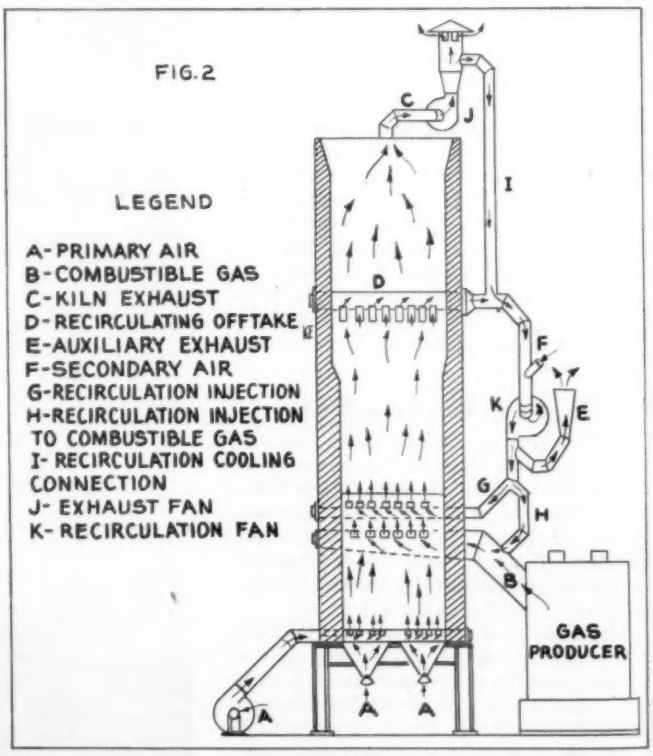


Fig. 2: Schematic diagram of gas circuit for completely controlled Azbe kilns

be so low and efficiency so poor? Quite evidently the factor of mixing was not satisfied. The gas and the air in considerable extent did not meet in the hot zone. They met later and higher up in the preheating zone where the heat generated could not be used for calcination but only for preheating the stone and wastage from the stack.

Recirculating gas was used in the attempt to obtain a hot zone mixture and higher temperature, but while it did help in part to induce a mixture, its high CO_2 combatted creation of higher temperatures.

Then an attempt was made to blend air with the recirculating gas. A hole was cut in the recirculating fan suction connections, Figs. 2 and 3 F, and a certain amount of air was allowed to enter and that proved to be the solution to the problem. The kiln hot zone heated up immediately and the top of the kiln cooled off. There was no more burning in the top of the kiln and so there was no more difficulty in obtaining sufficient draft.

Production increased even though the amount of fuel charged to the gas producer was greatly reduced and the fuel-lime ratio became quite satisfactory, about 4-1. This was good considering the nature of the fuel. There were good hangs and so the kiln was trimmed properly; good hangs even though the lime was drawn every hour and a half.

It is not exactly proper to introduce cold air at the recirculating fan as rightly all air should enter through the cooler. But if kiln streams refuse to mix, then it is better to do this than not. Lime may be drawn somewhat hotter, but the top of the kiln will be cooler and performance satisfactory because heat will be developed where it should be developed.

Initially, any kiln should be designed to enable proper mixing without secondary air injection. The hot zone at the gas inlet must be constricted, Fig. 1 B, and gas from the center burner must enter at good velocity. However, regardless of what the design may be, at times due to stone size and other reasons, the mixing may be poor. The recirculating stream which is high in CO_2 does a certain amount of mixing but it also tempers and at such times one does not want excessive tempering.

The entire problem is reduced to a new system of recirculation which at one time may be a gas high in CO_2 and very low in oxygen for some mixing but mainly for tempering. Then at another time the recirculating gas may be high in oxygen and low in CO_2 to create a considerable hot zone disturbance with relatively low tempering effect. The control is simple and all that is necessary is a small opening at the recirculating fan suction connection as shown in Figs. 2 and 3.

Control can be left to the fireman's discretion to regulate in accordance with the kiln condition. The idea, of course, is not to use any more than necessary of this secondary air. It also can be put under instrumental control, in which case the pressure in the recirculating duct of the center burner would be measured and the recirculating gas analyzed.

In this case, the gas port area of the center burner was 4½ sq. in. per ton, which is right, but distance from port of center burner to side wall was 2½ ft., (Fig. 1 A), which was too much particularly with the size stone, stone sorting method, and the disintegrating nature of lime. As the side wall was so straight it allowed air to pass freely with no tendency to deflect inward toward the center burner; that is, toward the gas stream.

To make conditions worse, the center burner itself had a bulge which directed the air stream toward the side wall and away from the above located gas ports as shown by the illustration. This is necessary as without this deflection, it has been found on other installations that heat developed around the center burner is too intense and the center burner deterioration is too rapid.

Influence of Hot Zone Constriction

Although the hot zone constriction is small, probably no more than 6 in. to each wall, one foot in all, (Fig. 1 B), the influence on proper kiln operation still is considerable for the following reasons:

1. The air stream up the loose side of the wall is retarded.
2. Air is deflected toward and into the gas stream (Fig. 1 B).
3. Necessary gas penetration is reduced, a complete combustible mixture is more readily obtained.
4. The upper ledge of the constriction aids in better hanging of the lime charge, assuring an improved trim even when lime is soft-burned under heavy CO_2 recirculation and low kiln temperature conditions.

Most likely if the kiln hot zone construction at Blubber Bay had been correct, probably little trouble may have been encountered, but as it was not, only recirculation solved the problem. However, even with correct construction, recirculation accomplished with force would aid mixing and would improve kiln hot zone temperature uniformity. Under virtually any operating conditions recirculation is of decided help but when the kiln design is right, less or no oxygen is necessary in the recirculating gas, and only spent but very hot gases are recirculated to aid mixing and to temper excessive heat attained through good mixing.

It may be questioned as to whether mixing should be aided if one then has to artificially temper excessive heat. A vertical kiln if it is to be a good kiln must operate on a counter current heat flow principle all through its height. In the cooler, the coldest air must contact the coolest lime and the hottest air must contact the hottest lime. Similarly, in the preheating zone the coolest gases should contact the cold limestone and the hottest products of combustion the hot stone. There should not be any burning in this section. Preheating should all be by normal sensible heat of spent gases, heat below calcination temperature, below say 1600 deg. F. There must not be any heat developed in the preheating zone through combustion of any of the gases or it will be completely wasted.

All combustion should take place in the lower half section of the calcination zone, then the gases in passing through the second half section would cool to 1600 deg. F. before entering the preheating zone. But if good mixing is not accomplished early in the calcining zone, it may take place too late, or not at all.

In a vertical column clogged with lime and stone there is little lateral mixing and the gases after being once distributed will tend to follow their respective channels and may not mix until entering the preheating zone or even later, causing over-delayed com-

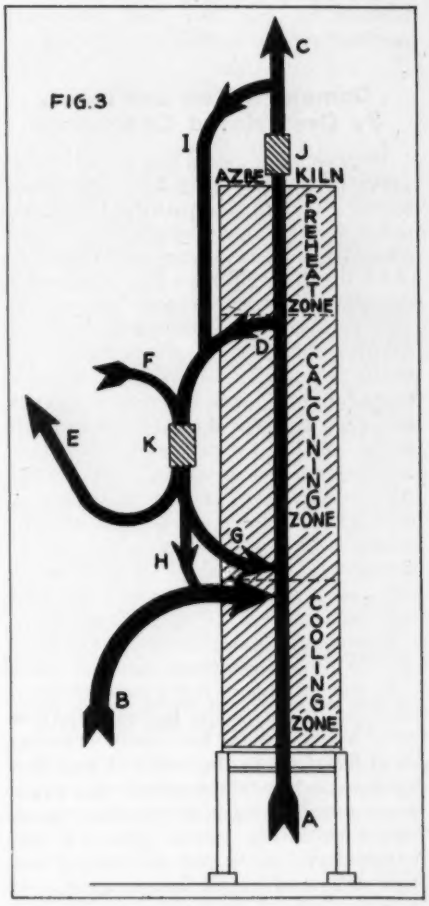


Fig. 3: Flow diagram of gas circuit for completely controlled Azbe kiln. Legend: (A) primary air; (B) combustible gas; (C) kiln exhaust; (D) recirculating offtake; (E) auxiliary exhaust; (F) secondary air; (G) recirculation injection; (H) recirculation injection to combustible gas; (I) recirculation cooling connection; (J) exhaust fan; (K) recirculation fan

bustion in one case and secondary combustion in another.

Damage to Fan and Lining By Overdelayed Combustion

Over-delayed combustion takes place in the calcining and preheating zones. Secondary combustion takes place in the open spaces above the preheating zone where all gases do come together. Many a fan is damaged through excessive heat caused by over-delayed and particularly secondary combustion. To avoid this there must be sufficient air drawn through by the maintenance of adequate draft, and then this air and the combustible gases must be brought together through correct assembly of the structural members of the hot zone region, through forcible projection of the combustible gas and through turbulence created by high velocity injection of the recirculating gas. This later also serves the purpose of avoiding excessive temperature and damage to lining or impairment of lime.

If the mixing is not good, temperature conditions of the hot zone may be very uneven. The hot spots creating stratifications in the vertical gas flow have a certain stack effect and draw from surrounding sections other gases into themselves which effect is accumulative. So a hot section of the kiln will tend to get hotter at the expense of the cool section which will tend to get still cooler. One could say that heat wants to go where there is too much heat rather than where there is too little. This is unfortunate in some respects but necessary as a whole as natural draft chimneys would not draw and weather would be strange indeed as it is created to a great extent by thermal air currents.

Mixing equalizes the kiln thermal currents which may further be equalized by proper trimming of the charge on hanging.

Analyses are frequently made of gases from lime kilns. One criterion is only a trace or no CO in the exhaust gases. However, initial mixing, as in Fig. 1 A, may have been poor and combustion may have been over-delayed, some of the heat may have been developed late in the calcining, and some in the preheating zone. Although there may have been no CO or Hydrogen by analysis at the exhaust fan, incomplete combustion loss nevertheless still prevailed.

When kilns are operated by the hang principle, as they ordinarily are, rather than the slip principle, it is important that the operator fully realizes that it is not merely a matter of bringing the charge down into the void created by drawing the lime, or to clean off accumulations on the walls, but it is important to break up the high heat channels to get as much of the hot lime out of them down into the cooler ahead of the less hot lime.

Heat channels, non-uniform hot zone temperatures which make proper trimming exceedingly difficult and demand an experienced man, are mainly caused by improper initial mixing of the gases. It all therefore comes back to a properly arranged and dimensioned carbureting section of the kiln and forcible mixing. Then more even temperatures will prevail across the kiln from wall to wall and trimming will be simpler and easier, there will be less core in the lime, escaping gases will be cooler, high draft more readily maintained, kiln capacity higher and fuel efficiency greater.

"Air," "Combustible," and "Mixing," are the important factors in making "Lime" and no one has yet reached the ultimate limit of any kiln's capacity. If more is not produced it is simply a matter that either one or the other of the three factors is not satisfied. The three must be in step, although more air than necessary is far less harmful than too much combustible. There is a very interesting relationship and failure to understand the sequences in the inter-action of the three factors is responsible for considering the kiln such a puzzling performance.

With natural gas there is always enough combustible, with producer gas not always, but generally there is. Draft may also be good although due to inadequate fan systems and leaky tops it frequently is not. More often it is poor mixing. Frequently the over-delayed combustion heats up the kiln exhaust gases unduly which lowers the exhaust gas fan capacity and reduces draft. With less air entering kiln, the combustible has an ever greater difficulty in getting its air and over-delayed combustion conditions become worse until secondary combustion takes place, that is, the excess combustible gases pass through the kiln and ignite in the kiln top after receiving the oxygen through the leaky stone charging doors.

With proper initial mixing this avalanche which ultimately may result in a burned out fan would not have occurred because draft would not have been so readily impaired.

Increasing kiln capacity, even very greatly, increases exhaust gas temperatures very little, and if stone is charged at regular intervals this can not become a limiting factor governing kiln capacity. Proper mixing tends toward utilization of all kiln sections. When the mixing is poor, many sections may appear hot but are not hot enough to make lime. Some are cool, relatively speaking, because they contain too much air and not enough combustible and others because there is too much combustible and not enough air. In between is an excessively hot streak reaching far up into the kiln as shown by Fig. 1 A.

At Blubber Bay when conditions were at their worst, draft was poor because stone was heated to the top and exhaust gases were therefore very hot. As the kiln was full no fresh stone could be charged to cool off the gases. As hot zone temperatures were too low and uniform, lime was not made to be drawn, to make room for fresh stone, to cool the gases and to obtain the draft to induce the air and heat up through the stone.

The kiln, excepting for the hot zone constriction, had everything. It had a quite adequate top exhaust fan and it had a good size recirculating fan. It also had a center burner arranged for forced recirculation and its only fault was excessive width.

To get the draft, a new system was tried because the recirculating fan was large enough. It was larger than necessary for just recirculation so the discharge was tapped to the atmosphere, Figs. 2 and 3 E, a system which is part of the Azbe recirculating patent but which was never before put in effect. The result was that there were two fans exhausting the kiln and there was sufficient draft.

This system of aiding the top exhaust fan by exhausting with the recirculating fan as well is entirely sound. Although the recirculating fan is connected far lower to the kiln shaft there is no reason why all of the gases need to pass through the entire height of the preheating zone as just a part of them contain enough to adequately preheat the stone.

The next step was to admit some air into the suction of the recirculating fan. With proper kiln construction this would not have been necessary but in this case it was. Mere turbulency was not enough, the air and combustible streams were too far apart but the additional air brought direct into the combustible, together with adequate draft, started the kiln to heat up immediately, and in not much more than a few hours time it was a normal high capacity kiln.

At first it all was extremely disturbing and discouraging, particularly in view of the severe lime shortage on the Pacific Coast, but it became an interesting experience which taught everyone a great deal and will result in benefits to be derived for a long time to come.

While Blubber Bay conditions happened, for various reasons, to be exaggerated, these conditions to a lesser extent are quite common and performance of many kilns is similarly impaired.

A contributing factor at times is the feeding of non-uniform stone, particularly under the condition where the smaller segregate from the larger stone either in their passage through the bins or in the charging of the kiln proper.

More frequently the fault lays with the disintegrating nature of the lime. Some lime shows a pronounced tendency to shrink on high heating making it become dense and heavy. With the outside hotter portion tending to

(Continued on page 135)

Reducing Pea Gravel to SAND With Rod Mills

West Coast sand and gravel plants have found it economical to manufacture sand from large surplus of pea gravel

By W. B. LENHART

POSSIBILITIES of efficient fine grinding by the use of rod mills have been demonstrated over and over again by metal mining operators. Use of rod mills in the sand and gravel industry to grind unwanted aggregate sizes to concrete sand has been suggested many times in these columns, for the rod mill has proven very dependable and gives a low operating cost, but what is still more important to the industry is the character of the sands produced by such grinding units. One of the first applications of rod mill grinding to produce sand was at the aggregates plant built near Redding, Calif., for the Kennett dam of the Central Valley Project. However, during the past year two installations of open-end, Marcy rod mills were made, and we are fortunate in having secured considerable operating data on both these machines.

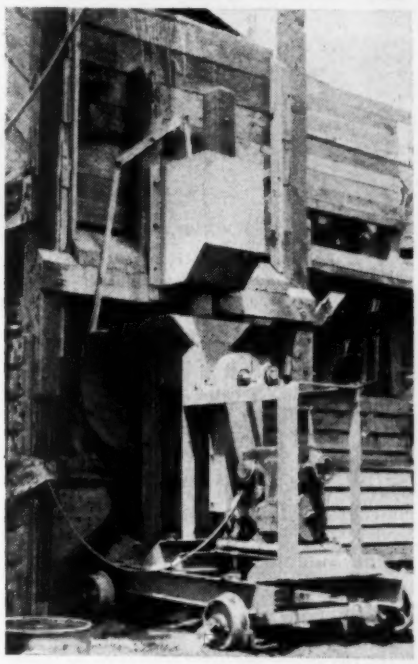
Basic Principle of Operation

For the novice, who may be unfamiliar with fine grinding terminology, a rod mill is a heavily-constructed steel cylinder, that revolves in a horizontal position. In the interior are placed heavy steel rods, usually 3 to 4 in. in diameter and as long as the mill. The material to be ground is fed into one end and discharges out the other. They usually operate wet. They operate on the same principle as the more familiar ball mill except that in the case of the latter, steel grinding balls are used in place of rods. The Marcy rod mill is so designed that rods cannot get out of the mill and the rods remain straight and do not become entangled within the mill. They also afford a quick means of discharging the finished material from the mill. The open end makes it easy to inspect the interior of the mill, to re-line it, and to add more rods when needed.

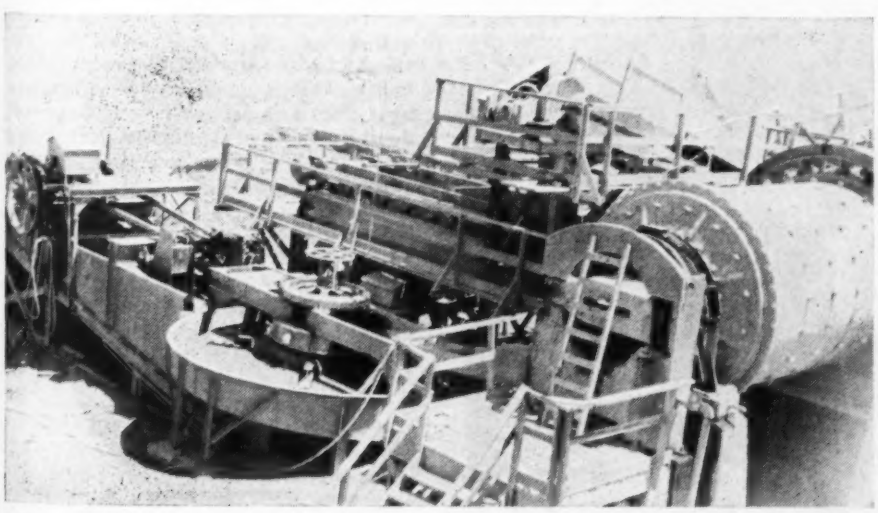
There is no great amount of pulp to interfere with impact crushing and, the fines in the mill move forward faster than the coarse, aiding in greatly increasing the capacity. The mills have a large capacity and are as near a fool-proof machine as one could wish.

The character of the finished material, i.e., its screen analysis, can somewhat be controlled by variations in the amount of water used in the mill. Too thick a pulp tends to "float" the rods and to spread them, resulting in a loss in grinding efficiency. For most efficient grinding, the rods should work on thin layers of a pulp that are still thick enough to coat the rods thoroughly. High capacities and uniform discharge of the product can be maintained by keeping a small amount of voids in the rod mass. However, for grinding various non-metallic minerals, it may be desirable to use a very wet pulp and to sluice the fines out of the mill as rapidly as possible. This will prevent over-grinding and may even give greater capacity but will do so at the expense of liner and rod wear. At both the installations discussed in the following, a very dilute pulp is used, since that practice seems to give a more desirable product.

Based on the experience of these two operations, it will be observed that a rod mill can readily grind to 8- to 20-mesh fineness in one passage through the mill and will produce a fairly uniform product. It can grind in the 20- to 40-mesh range very efficiently when operated in conjunction with screens or classifiers. It can also grind in the 48- to 100-mesh range when used in conjunction with mechanical classifiers but when one gets into the finer sizes, possibly a ball mill would be more efficient. However, in the production of sand by grinding, it possibly is operating under optimum conditions. Power requirements are reasonable and the cost of the grinding media is nominal. Mills are available in a large number of sizes ranging from the 2- x 4-ft. mill to the



Feeder can be moved back from rod mill on track when rods are added to the mill



Close-up of rod mill installation which discharges to bowl of classifier, to the left

View of Radum plant of Henry J. Kaiser Co., showing stockpile of 3,000,000 tons of pea gravel which is being reduced to smaller sizes by grinding in rod mill. Tractor and dozer push material to reclaiming hopper serving grinding plant

7- x 15-ft. size, which, when grinding to 8-mesh fineness, have capacities from about 25 tons per 24 hr. up to 1280 tons. Even larger rod mills, 8- x 20-ft., have been used in metallurgical operations. Feed in the 1-in. range is usually recommended but a finer or coarser feed can be handled just as easily. The writer has had excellent results using 2½-in. feed. However, when such a coarse material is fed, the rod wear at the intake end of the mill usually becomes excessive, so the rods must be turned end for end occasionally or be replaced.

Feed Mill from Both Ends

In practice for sand production, it has been found that for the production of a relatively coarse product that nearly all the necessary grinding is done in about the first one-third of the mill's length and that, once the product gets that far along in the mill, it could just as well be ejected. Shortening the length of the mill without corresponding changes in the diameter would lead to snarling of the rods or running out of parallel. To take advantage of the fact that the feed is reduced to commercial sizes in the first few feet of mill length, the peripheral discharge mill was developed. This mill is fed at both ends simultaneously and the ground product discharges through ports in the shell near the center line. One of the Marcy mills mentioned in this article is of this type and it will be seen that a high capacity, related to the size of the mill, is maintained. The upkeep on such a mill outside of liner and rod wear is practically nil and the life is great. Original costs of the mill in the larger sizes for the production of sand, as herein described, runs from $20 to $25 per ton of capacity. To this must be added the installation charges, so it is not a cheap installation, but where conditions warrant, a rod mill can be made to do a first class job.

Both mills considered here are fed pea gravel (minus ⅜ in.) as that size is much in excess of demand. Both plants have huge piles of this size of product, and these piles hold several million tons of pea gravel each. In one pass through either mill there is no plus ⅜-in. or plus ¼-in. material in the discharge product, making it possible to run the mills without elaborate classifying and return equipment. However, de-watering devices might have to be considered in some other cases.

Radum Plant

In the February, 1941, issue of ROCK PRODUCTS, pp. 91-92, we described how this plant was preparing ground sand using a Symons cone crusher operating in closed circuit with a vibrating screen. At that time an 8- x 12-ft. Marcy rod mill was being installed and now has been in operation about five months (June, 1947). The mill carries a load of 70,000 lb. of Sheffield high carbon rods. At the outset, 4-in. diameter rods were used but the operators found the 3-in. size more satisfactory. Corrugated manganese liners are used but figures on liner wear are unavailable. However, the mill still has the set it started with. The mill is fed at one end only, discharging through the other into the bowl of a 15-ft. diameter Dorr duplex rake classifier. The sand or rake product goes to a 30-in. x 30-ft. dewatering screw that sets at a 15 deg. angle. The dewatered sand falls on to an inclined belt conveyor and is delivered to a steel loading hopper that serves for truck and car loading. There is no circulating material and the pea gravel only passes through the mill once; yet there is no plus ⅜-in. or even plus 4-mesh material in the discharge product. The Marcy rod mill uses the bell-type feeder. The rod consumption to date has been 1.0 lb. per ton of sand produced. A very thin pulp is used.

Inclined dewatering screw at Radum plant

The short-head grinding plant previously used is being revamped and will continue in use with the exception that now the oversize from the Symons vibrating screen will pass to the rod mill instead of going back to the Symons cone crusher. This will give about 20 t.p.h. additional capacity. The Marcy rod mill is driven by a 325-hp. synchronous motor and is producing 60 t.p.h. of sand.

The present installation gets its feed material from a 3,000,000-ton stockpile. The tunnel for the reclaiming belt is being driven an additional 25 ft. so that the intake to the belt will be directly under the point where the main plant stacker belt discharges. At present a tractor and dozer are being used to push the material away from this point and to the grinding circuit.

The Radum plant is well known to most of our readers as it is owned by the Henry J. Kaiser Co. Bart Carter is superintendent; Charles Jones, plant superintendent; L. A. Abrott, plant engineer; and Robert Mills, plant technician.

SCREEN ANALYSIS OF ROD MILL SAND PRODUCT

Passing Mesh (in.)	Radum Plant (%)	Pacific Coast Aggregates Plant* No. 118	
⅜	100	100	100
¼		100	100
4-mesh	100	92	92
6	98		
8	82	52	52
14	49		
16		26	28
30	28	14	14
50	15	8	12
100	7	3	4
200	2	1	1
270	2		

*Two screen analyses given for different days. It will be noted one analysis gave more of the finer sizes.

Pacific Coast Aggregates, Inc.

Plant 118 of Pacific Coast Aggregates, Inc., was originally built as a ballast plant and is located in the Livermore Valley district only a short distance from the company's large Elliot plant that is now under construction. A dragline is used in the pit and 20-ton Euclids for hauling. An 18- x 24-in. Universal jaw crusher and a 3-ft. Symons cone crusher are used for primary and secondary reduction, respectively. A revolving scalping screen is used that has an outer jacket which at present carries ¼-in. openings but later will be enlarged to ⅜-in. openings so as to get a higher percentage of this size to send to the rod mill. The throughs from the revolving screen flow to a Symons vibrating screen and the sands from this screen drop into a drag classifier. The oversize goes to the rod mill feed bin.

Inasmuch as the capacity of the rod mill is 43 t.p.h., and the production of pea gravel is only about 15 t.p.h., the difference is made up by reclaiming pea gravel from the stockpile. The mill is built close to the stockpile. A

Caterpillar tractor and dozer now push the stockpiled material to a hopper from which it is fed to an inclined belt serving the rod mill feed bin. A gravity discharge gate to the belt is used, as the material is free running.

Rod Mill Grinding Experience

By D. A. GILDERSLEEVE*

AN ECONOMICAL METHOD of grinding commercial sand from larger particles of rock or gravel had not been attained until recently, when an improved type of rod mill made its appearance. Many aggregates producers will be interested in this development especially where the sands are deficient in fines.

Pacific Coast Aggregates, Inc., at its Eliot, Calif., plant recently installed one of these new type mills for sand grinding. The rod mill, a 5- x 10-in. Marcy, is fed into both ends and discharges through peripheral ports in the center of the shell. This type of mill will produce a better grade of sand than the old style, full length, mill commonly used in ore grinding where extreme fineness is required, because most of the grinding is done the first 4 or 5 ft. after the material enters the mill and from there on needless pulverizing takes place. In the new type mill greater capacity is possible and more efficient operation results from what is virtually two mills in one.

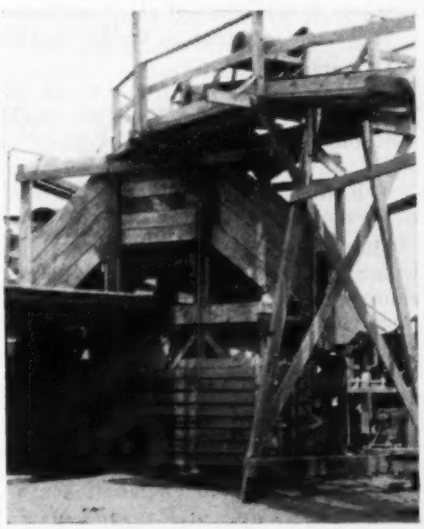
The 5- x 10- mill of this plant has many interesting features, but most important is its simplicity and low maintenance cost. A weekly inspection of its interior and addition of extra rods when needed is about all that is required to keep it going.

It is fed by two Reeves variable speed screw feeders mounted on small car wheels and rails, that can be rolled back in the clear for inspection of the mill or removal and replacement of rods. A water jacket through the feeders allows water to be injected along with the feed. These screw feeders receive their supply by gravity from overhead bins kept filled to the proper level by a conveyor belt which carries the material up from a hopper under which a controllable feed gate is located. It is possible to maintain a positive uniform feed with these Reeves feeders.

The mill is driven by a 100 hp. electric motor through V-belt pulleys, and it turns at the rate of 26 r.p.m. The one-inch thick steel shell is lined with alloy-steel approximately 3 in. thick, securely bolted to the shell. Manganese steel is generally used for lining these mills, this being one exception. The grinding rods are 10 ft. long. At the outset 11 tons of rods were placed in the mill, consisting of three sizes; 2-in., 2½-in. and 3-in. Starting off, three sizes of rods are used in order to cut down the voids between the rods but as the rods wear, only the 3-in. size is added. After the rods are worn down to an inch or less in diameter they are removed to prevent bending which would cause snarling of the other rods. An interesting feature of this mill is that rod wear is less than half what the builder of the mill estimated it would be, which adds greatly to the economy of operation. Maintaining the rod load in the mill at maximum level is very important since a slight deficiency here will affect the grinding efficiency. This was well born out when, after several weeks operation it was found that the rod load in the mill could be built up an extra ton. A notable increase in production resulted.

This mill was set up as a part of a plant producing sand and gravel, adjacent to a large stockpile of surplus ¼- to ⅜-in. pea gravel. It was arranged so that if the pea gravel produced by the plant was insufficient to feed the rod mill, material from the stockpile could be brought in to the feed hopper supplying the mill. For a time the rod mill was fed partially from the mill screens and by bulldozer from the stockpile. Later the ⅜-in. screen producing the pea gravel was replaced by one with a ¾-in. opening, sending everything between ¼-in. and ¾-in. to the rod mill.

The product of the mill is lifted by bucket elevator high enough to be flumed to a 4- x 12-ft. Symons vibrating screen where it blends with the regular mill run sand and passes on to a drag type classifier and thence by conveyor belt to stockpile from which it is loaded into cars for shipment. In this operation the mill run sand is of such quality that so long as both the rod mill and the gravel plant are in operation at the same time, the mill can be fed to full capacity and its product blended successfully with the mill run sand.



Bin over peripheral discharge of rod mill feeds both ends of mill at Pacific Coast Aggregates plant No. 118

After two months of operation, part of which was taken up with more or less experimental running, this mill produced 27,000 tons of sand. Rods consumed amounted to .419-lb. per ton of sand produced.

Only enough water is used (approximately 20 gal. per minute) at full feed, to keep the pulp in a fluid state. Experimenting with different amounts of water brought two very definite conclusions: (1) too much water has a tendency to sluice the material through the mill thereby reducing its grinding efficiency; (2) not enough water causes pulp to build up between the rods practically stopping the grinding effect altogether.

By the sound of the rods moving in the mill with a proper or improper feed, also by the right amount of water, the operator soon can tell when it is working correctly.

A series of tests were made which showed some interesting results. Following are some screen analyses showing the fineness of sand produced with different feed loads. These samples were taken directly from the mill before being screened or classified.

Passing ¼-in.	51 TPH % 84	30 TPH	20 TPH
4 Mesh	78	100	100
8 Mesh	41	90	91
16 Mesh	23	65	76
30 Mesh	14	41	62
50 Mesh	8	25	24
100 Mesh	3	11	9
200 Mesh	1	3	3

From these screen tests it can be seen that if a very fine product is required for blending with coarse sand, it can be made by simply reducing the input to the mill. Also it is notable that at peak load of 51 t.p.h. 16 per cent is rejected over a ¼ in. screen which gives a net production of approximately 43 t.p.h.

This mill has clearly demonstrated that commercial sand can be ground economically from gravel. The first cost of an installation of this sort may be high but low operating and maintenance costs will make its use profitable to the producer where sand is needed to balance his plant output.

Central Office and Garage For Sand and Gravel Firm

LESLIE L. CLYMER, owner of three stone companies in Ohio, has taken space in Marysville for a general office, and is building a central garage for maintenance and repair of equipment from the four quarries involved. The three companies are: Tri-County Stone Co., Union Stone Co., and West Jefferson Sand and Gravel Co. Marysville was chosen for the general office because of its central location as regards all operations.

*Plant Superintendent, Pacific Coast Aggregates, Inc.

Chemist Corner

RAPID CONTROL METHOD

For the determination of slag in Portland-Blast Furnace Slag Cement

By W. J. McCOY*

IN THE PRODUCTION of a portland-blast furnace slag cement, it is very useful to have a rapid control method for the determination of the slag content. A regular chemical analysis does not indicate the slag content since the same major constituents; namely, SiO_2, Al_2O_3, Fe_2O_3, CaO and MgO occur both in slag and portland cement clinker in the same approximate order of magnitude.

Several special procedures appearing in the literature for the determination of slag in portland-blast furnace slag cement mixtures were investigated but none appeared to be satisfactory for plant control. These procedures included ones based on selective solution of cement portion with a weak acid.† In most cases these methods were too long and frequently only approximate results were obtained.

Since the procedures suggested in these references were not satisfactory, a method was devised which enables one to determine the amount of slag in a portland-blast furnace slag cement mixture in 10 minutes with an accuracy of ±0.7 per cent. The method is based on the relatively high reducing value of the slag portion and the very small reducing value of the portland cement constituent. This is illustrated in the following tables; the first table contains the reducing values of slags from six different plants in terms of milliliters of potassium permanganate solution (4.5 grams $KMnO_4$ per liter). The second table includes the reducing values in terms of milliliters of potassium permanganate solution of portland cements from six different plants. Individual values of duplicate determinations are given to point out the precision of the method.

Slag Samples	Reducing Values Determination I	II	Avg.
1	23.44	23.34	23.39
2	20.92	20.80	20.86
3	27.34	27.42	27.38
4	28.16	28.20	28.18
5	20.70	20.74	20.72
6	26.21	26.30	26.26

Cement Samples	Reducing Values Determination I	II	Avg.
1	0.16	0.13	0.14
2	0.09	0.08	0.08
3	0.12	0.14	0.13
4	0.07	0.07	0.07
5	0.19	0.16	0.18
6	0.14	0.11	0.13

*Manager, Research Laboratory, Lehigh Portland Cement Co., Coplay, Penn.

†P. N. Grigor'ev and S. E. Charkina., Tonind.-Ztg., 56, 1206-07, 1932; Microscopic Inspection, H. W. Gonell, Zement, 17, 437-43, 1928: Determination of S and SO_3, F. Keil and F. Gille, Zement, 27, 541-6, 1938; and Iodometric Method, P. Budnikov and S. Zhukovskaya, Zavodskaya Lab., 7, 1124-33, 1938.

Special Solutions

Potassium Permanganate: Dissolve 4.500 grams of $KMnO_4$ per liter of distilled water.

Sodium Oxalate: Dissolve 9.000 grams of $Na_2C_2O_4$ and 25 ml. of H_2SO_4 per liter of distilled water.

Standardization of Solutions

Absolute oxidation or reduction factor for these solutions is not important, but it is necessary that one solution should be exactly equivalent to the other. If the solutions are made up as directed the potassium permanganate solution will be a little too strong and its dilution to the desired concentration can be made as follows: 10 ml. of the sodium oxalate solution are pipetted into a 250 ml. beaker, 100 ml. of water and 20 ml. H_2SO_4 are added and the solution is titrated with the potassium permanganate solution to a pink end point that persists for at least 30 seconds. Sufficient heat is obtained from the solution of the sulfuric acid to warm the solution adequately for the titration. The volume of permanganate solution required for the titration should be less than 10 ml. and the number of milliliters of water for its dilution can be calculated by dividing 10 by the number of milliliters of $KMnO_4$ required in the titration, subtracting 1 from the result obtained and then multiplying by the number of milliliters of stock solution.

Example:

10 ml. $Na_2C_2O_4$ required 9.40 ml. of $KMnO_4$ for titration. 1.950 ml. stock solution.

$$\frac{10}{9.40} = 1.0638 - 1 = 0.0638$$

$$0.0638 \times 1{,}950 = 124 \text{ ml.}$$

Therefore in this case 124 ml. of water should be added to the potassium permanganate solution. This adjustment should result in a titration value of 10 ml. (±0.05 ml.) to react with 10 ml. of the oxalate solution. If not the adjustment should be continued until this condition is obtained.

Determination Procedure

First the reducing values of a representative sample of slag and of cement are individually determined.

In preparing the representative samples of slag and cement for analysis, they should be finely ground and all metallic iron removed by a magnet; 0.50 gram of slag is weighed into a 250 ml. beaker and then thoroughly dispersed in 100 ml. of water. A 20 ml. portion of the potassium permanganate solution is added by means of a pipette and then, while stirring, the sample is completely dispersed in the solution, and 20 ml. of concentrated sulfuric acid are slowly added. The stirring is continued for 1 to 2 min. after addition of the acid and then a 15 ml. portion of the sodium oxalate solution is added (pipetted). The solution should now be colorless and is titrated with potassium permanganate until a faint pink persists for 30 seconds. (Titration Value + 5.00) × 2 = Reducing Value of Slag. It should be noted that in case a strong pink or purple coloration does not persist in the solution after the addition of the sulfuric acid, the determination should be rejected and repeated, using 25 ml. or more, if necessary, of potassium permanganate solution to insure a dark pink color after the addition of the acid. The same is true in regard to the sodium oxalate solution; if an addition of 15 ml. does not result in a colorless solution then more should be added until it is in excess and the solution is colorless. The specified volumes of permanganate and oxalate are for a typical slag, but it may well be that these volumes will have to be adjusted as noted. In case any adjustments are made, then the

Reducing Value of Slag =

[Titration Value + ($KMnO_4$ addition — $Na_2C_2O_4$ addition)] × 2

The reducing value of the cement in many cases is negligible, but it should be checked in the following manner: 1.00 gram of cement is weighed into a 250 ml. beaker and then thoroughly dispersed in 100 ml. of water. A 5 ml. portion of the potassium permanganate solution is added by means of a pipette and then while stirring and the cement is completely dispersed in the solution, 20 ml. of concentrated sulfuric acid are slowly added. The stirring is continued for 1 to 2 minutes after addition of the acid and then a 10 ml. portion of the sodium oxalate solution is added (pipetted). The colorless solution is now titrated with potassium permanganate until a faint pink persists for 30 seconds.

Reducing Value of Cement = (Titration Value + 5.00) — 10

The reducing value of the slag-portland cement sample is determined by the same procedure as used for the slag sample except a 1 gram sample is used. The notations regarding the removal of iron with a magnet, and the possible need of adjustment in quantities of oxalate and permanganate added previous to the titration also apply in this case.

Reducing Value of Slag-Portland Cement =
Titration Value + ($KMnO_4$ addition — $Na_2C_2O_4$ addition)

The technique of adding an excess of sodium oxalate solution and then back titrating with potassium permanganate is done since a much better end point is obtained when the titration is carried out from a colorless solution to a pink coloration than from a pink solution to colorless.

Calculation of Results

After determining the reducing values of the slag, cement and the slag-cement mix, the following formula is convenient to use for calculating the percentage of slag in the mixture:

$$\text{Per cent Slag in Mix} = \frac{(\text{Reducing Value of Mix} - \text{Reducing Value of Cement}) \times 100}{(\text{Reducing Value of Slag} - \text{Reducing Value of Cement})}$$

Example:

Reducing Value of Slag = 26.30
Reducing Value of Cement = 0.10
Reducing Value of Mix = 13.50

$$\text{Per cent Slag in Mix} = \frac{(13.50 - 0.10) \times 100}{26.30 - 0.10} = 51.2\%$$

This calculation shows that the mix contained 51.2 per cent slag. Usually the cement will have a reducing value of less than 0.20 and in those cases it may be disregarded without introducing any appreciable error. When the reducing value of the cement portion is disregarded, then we assume that the reducing value of the slag-portland mix is derived entirely from the slag. When this is done, the calculation of the percentage of slag is simplified, and is done in the following manner:

$$\text{Per cent Slag in Mix} = \frac{\text{Reducing Value of Slag-Portland Mix}}{\text{Reducing Value of Slag}} \times 100$$

Using the data given in the previous example:

$$\frac{13.50 \times 100}{26.30} = 51.3\%$$

This result compares favorably with that of 51.2 per cent slag as obtained by the other method in which allowance is made for the reducing value of the cement component, which in this case was 0.10 ml.

The frequency at which the reducing value of the slag should be checked during a grind of portland-slag cement will depend upon the uniformity of the slag in this respect. Usually very little variation occurs as, for example, two grab samples and one composite sample from a carload of slag had reducing values of 26.9, 26.3, and 26.3, respectively. If some variation does occur, composite samples representing various portions of slag could be checked for reducing values. The reducing value for a given lot of slag would be used in the calculation when the sample of portland-slag cement, being analyzed, contained slag from that lot.

It can generally be safely assumed that the portland cement constituent for a given grind will have a uniform reducing value.

Known mixtures of portland-slag cement were checked by this procedure and the determined values had a maximum deviation of ±0.7 per cent from the values used in proportioning the mixtures. These mixtures were prepared by grinding carefully weighed amounts of slag, portland cement clinker and gypsum in a 25-lb. laboratory jar mill to a normal cement fineness. The following data were obtained when the percentage of slag in these known mixtures of portland-slag cement was determined by the described methods, as shown in the tabulation at the bottom of this page.

Summary

A simple control method is described which enables one to accurately determine the amount of slag in a slag-portland cement in 10 minutes time. Only two standard solutions are employed and no special apparatus is used—the only apparatus required being ordinary laboratory equipment such as beakers, pipettes and a burette.

Mixture	% Slag Det'n. I	II	Avg.	% Error
25% Slag No. 1, 75% Clinker No. 1 + Gypsum	24.3	24.6	24.5	—0.5
50% Slag No. 1, 50% Clinker No. 1 + Gypsum	49.7	49.6	49.7	—0.3
25% Slag No. 2, 75% Clinker No. 2 + Gypsum	24.5	24.5	24.5	—0.5
50% Slag No. 2, 50% Clinker No. 2 + Gypsum	50.3	50.4	50.4	+0.4

Opens Gravel Pit

ELMER BOGENER has announced the opening of a washed sand and gravel pit at Kahoka, Mo., with hauling facilities for purchases made at the site.

Absorption, Soundness Tests Of Maine Sands Correlated

IN TESTS CONDUCTED at the Maine Technology Experiment Station, University of Maine, Orono, it was found that a definite relationship exists between soundness and absorption of sand particles. This is a distinct advantage because of the time saved in making an absorption test over a soundness test (absorption test, 2 days; soundness test, 18 days). All tests, under the supervision of Horace Pratt, associate engineer at the university and Andrew Adams, Maine State Highway Department Engineer, division of bridges, were carried on in strict conformance with rules of the American Society for Testing Materials. Not only was the relationship between results of soundness and absorption tests correlated, but it was also found that the highest correlation with standard soundness occurred in 8- and 14-mesh fractions. A total of 62 samples of sand from areas well distributed over the state were used in the extensive testing.

An important point that would have a bearing on similar test-correlations in other states is the fact that Maine sands do not contain an appreciable amount of limestone. Maine sands vary, mineralogically, from wholly granitic (quartz and feldspar) to those containing large percentages of quartzite, schist and shale.

Soundness test results, based on 25 tests and check tests, checked 46 per cent closer when the material being tested was dried to constant weight rather than for only seven hours at each cycle. In order to dry the sand to constant weight, especially the 48-mesh fraction, it was necessary to leave the samples in the drying oven for a 28-hr. period.

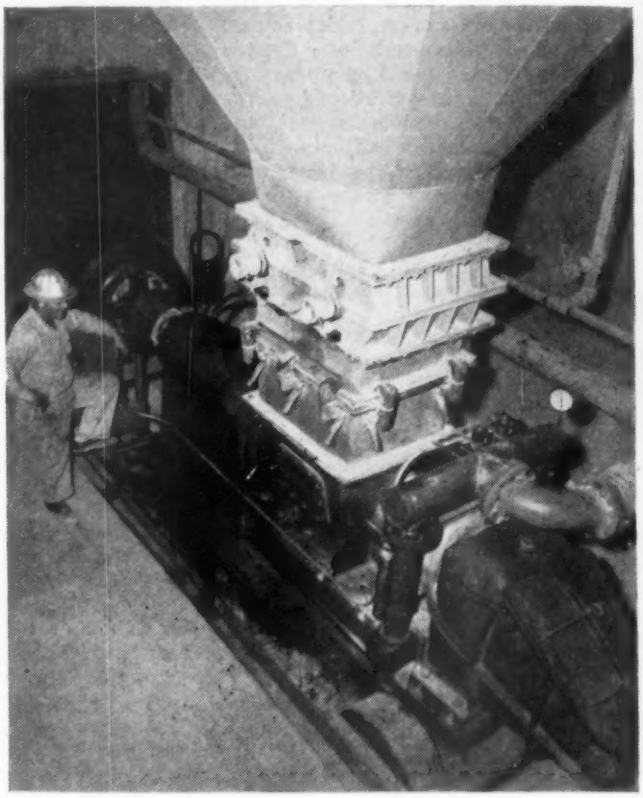
The relationship existing between the soundness and absorption tests is highly significant, as shown by the correlation coefficient: r = 0.8056 ±0.0301. The relationship between soundness of sand and soundness of the 14-mesh fraction is also very high, as evidenced by the correlation coefficient: 0.9469 ±0.0089. Soundness and absorption tests apparently both measure similar characteristics of a sand, as witness the high relationship existing between results of these two tests.

Lone Star Program Advances

LONE STAR CEMENT CORPORATION recently received bids for its New Orleans, La., plant improvements which are part of the $1,000,000, previously announced. The bids covered a building for the dust collector and the kiln stack.

Handle Large Volume of Cement Exports With Bulk Loading Plants

Permanente Cement Co. operates large cement shipping and distribution facilities at Redwood City, Calif., and Seattle, Wash.



Cement pump under truck hopper at Redwood City, Calif., bulk-loading plant with a capacity of 1000 bbl. per hr.

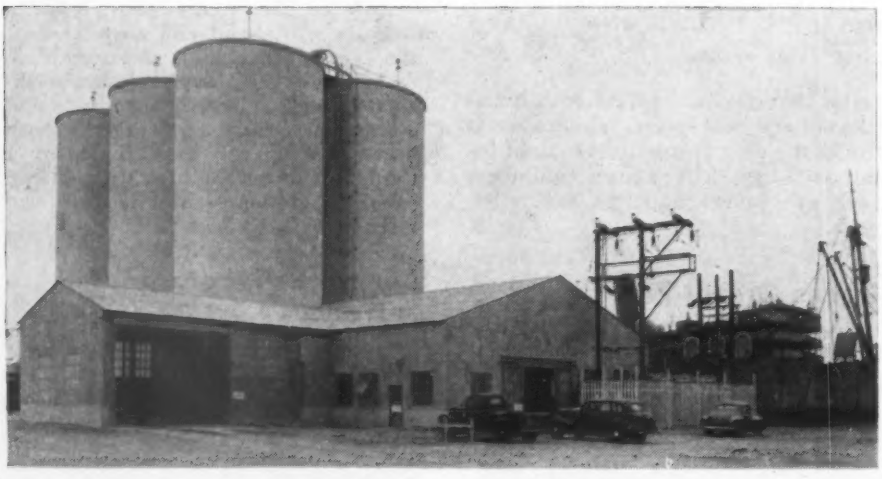
BUILT during the early phases of World War II and operated under Navy jurisdiction, the bulk cement loading facilities of the Henry J. Kaiser-managed Permanente Cement Company, located at Port of Redwood City, Calif., have until recently been clothed in secrecy. The bulk loading plant on South San Francisco Bay for water borne shipments becomes increasingly important with the placing in operation of Kaiser's new Seattle, Wash., bulk cement handling equipment, storage silos and ready mix plant along with continued shipments to Honolulu.

To take care of the increased area being served by Permanente, and as another step towards solving the shortage of building materials, the company is enlarging its cement plant to produce an additional 500,000 bbl. of cement per year, bringing the plant's capacity up to 5,500,000 bbl. per year, or slightly in excess of 15,000 bbl. per day. These additions at Permanente call for the expenditure of about $1,000,000, including installation of four Fuller coolers on each of the four kilns; an additional raw mill; a third slurry tank, and additional clinker crushing equipment. This is the third major expansion that Permanente has gone through, the first being in 1940 and the second in 1941.

At the Port of Redwood City, the Permanente Cement Company built six concrete storage silos which with the interstices have a capacity of 70,000 bbl. The company hauls the cement in International blimp-type bulk trucks holding 83 bbl. Each truck pulls a hopper-type trailer having a capacity of 105 bbl., making the payload total 188 bbl. of cement. The haul from the main plant to the bulk loading unit is 20 miles and time required for the round trip, including loading and unloading, is roughly two hours. The company also has 10 Peterbilt and Sterling Diesel flat rack trucks for handling bulk transport cans, each holding 30 bbl. per can; however, these haulage units have not been used for the seaborne shipments.

At the outset, Permanente Cement Co. had two bulk carriers, the S.S. Permanente and the S.S. Philippa, each having a dead weight tonnage of slightly in excess of 11,000 tons and capable of hauling 55,000 bbl. of cement each. These boats were sold in 1943 and for the time being the company is using the S.S. Santa Cruz. However, recently, the company purchased a Victory ship which has been fitted out with Fuller-Kinyon cement handling equipment. The new boat was placed in service about July 1. The equipment on the new boat will be identical with that on the S.S. Permanente, consisting of three Type "D" Fuller-Kinyon unloaders, each using 150 hp. They will unload at the rate of 1200 bbl. per hour for the three machines. The compressors on the new ship will be similar to those on the S.S. Philippa; three Fuller-Kinyon Type C-300, each driven by a 200-hp. motor and delivering 1600 c.f.m. at 40 lb. pressure.

Bulk cement hauled to the silos at Port of Redwood City is dumped to a road-level, truck hopper having a capacity of 300 bbl. Under this hopper is mounted a 10-in. Fuller-Kinyon pump directly connected to a 250-hp. General Electric motor. The pump delivers the cement to the various silos and interstices (see ROCK PRODUCTS, January, 1943). Under the silos, which are arranged in two rows of three silos each, is a track on which rides a roller bearing flat car. On this flat car is mounted a second 10-in.



Storage silos at Port of Redwood City for loading bulk cement to ship "Permanente"

R. J. "Rocky" Ryan, superintendent, Redwood City bulk-loading plant, to the right, and G. H. Copeland, left, his assistant

At opening of Seattle bulk distributing plant. Left to right: Ed Kendall, Seattle division manager; Bill Jackson, plant manager of Glacier Sand and Gravel Co.; C. R. Shinn, vice-president, Morrison-Knudsen Co., a Permanente stockholder; W. A. Marsh, assistant general manager of Permanente Cement Co.; J. A. McEachern, president of General Construction Co., a Permanente stockholder; and James Beatty, sales manager of Permanente

Fuller-Kinyon pump. This pump with its motor weighs about 10 tons, and while not exactly a portable unit, at this plant it is portable, for the 10-in. pump under the road hopper can be pushed out from under the road hopper and by means of a Cook electric hoist lifted to a traverse car which is then spotted to line up with the rails under each silo. The hoist is directly connected to a 20-hp. U. S. motor. Two men can push the 10-ton pumps under any desired hopper and make all connections in about 25 minutes. Thus for loading the silos one pump is used at the truck hopper, but when boats are being loaded both 10-in. pumps come into use. The two pumps can load at the rate of 1000 bbl. per hour each. The S.S. Santa Cruz was loaded in 20 hours with 36,000 bbl. of cement, total elapsed time. Air for these two units is supplied by two duplex C-200-200 compressors that can deliver 200 c.f.m. at 40 lb. pressure, a total of 800 c.f.m. Each set of two compressors are driven by a 200-hp. General Electric motor directly connected to both extensions of the motor's rotor shaft. Electricity is used at 2300 volts with all controls being Westinghouse. A concrete foundation for a third air compressor is provided.

The Redwood City bulk handling plant loaded 480,000 bbl. of cement during 1946. Two loads went to the new Seattle plant; the balance to Honolulu. During one war year it handled slightly in excess of 1,000,000 bbl. of cement. It requires 3½ days to make the trip to Seattle and nine days to Honolulu.

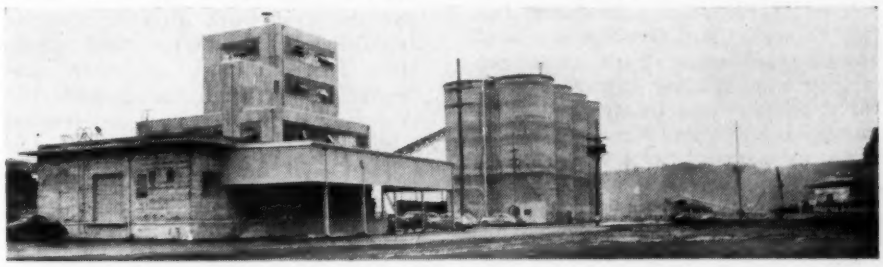
R. J. (Rocky) Ryan is in charge of all ship loadings for Permanente Cement Co., assisted by G. H. Copeland.

Seattle Division Plant

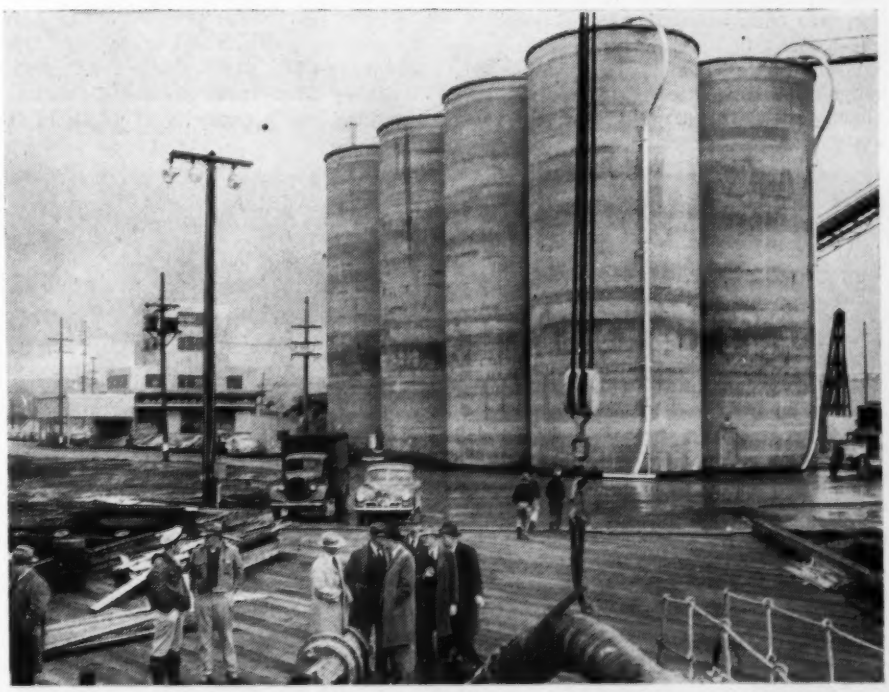
Somewhat similar facilities to the Redwood City, Calif., bulk loading plant have been built by Permanente at Seattle, Wash., except that here the plant will serve more as a distribution center. Bulk cement moved by ship from Redwood City will be pumped from the hold of the ship to the Seattle plant's silos which have a capacity of 80,000 bbls., including interstices. There is also a pack house with a 4-tube bagging machine with belt conveyors to transport sacked cement either to railroad cars and trucks or to the storage warehouse.

The Seattle distribution plant which started operations on October 25, 1946, is located on 11 acres of tideflat land along the Duwamish Waterway on Seattle's south side industrial district.

E. H. KENDALL, manager of the Seatle plant, joined Permanente in 1943, and prior to that had been associated with the Pacific Coast Aggregates Co., since 1933.



Cement from bulk-carrying vessel, right, is pumped to silos, center, and then conveyed by pipe lines to the pack-house at left, from which both sack or bulk shipments can be made



First bulk shipment of cement is pumped through pipeline, foreground, from ocean vessel to new Seattle silos which have 80,000-bbl. capacity

A "slusher" will deliver material from storage pile to this travelling hopper over reclaiming belt

Hydraulic classifier prepares six different sizes for more efficient operation of concentrating tables in the preparation of high grade glass sand at the new plant of Nevada Silica Sands, Inc.

By W. B. LENHART

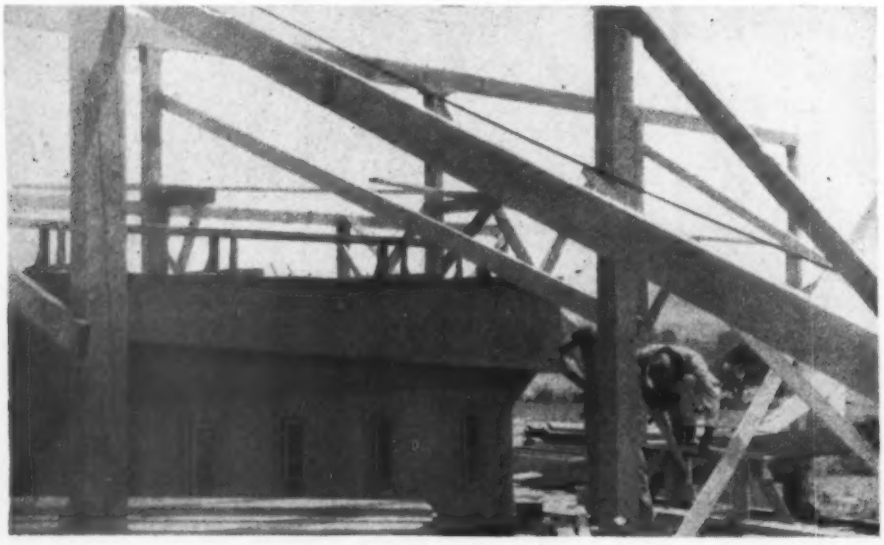
Step Up GLASS SAND Production

TO REPLACE A PLANT which had been in operation 17 years and take advantage of more modern methods and equipment, Nevada Silica Sands, Inc., built a new plant one mile west of Overton, Nevada, some 65 miles east of Las Vegas. This company is a subsidiary of Fibreboard Products, Inc., Los Angeles, Calif. Overton is a small Mormon settlement built as a community and trading center for the early settlers who located along the Muddy river, a small stream that originates as a warm spring in the desert and now empties into an arm of Lake Meade, the large artificial lake formed by Boulder Dam. The Muddy Valley is a veritable oasis in this hot and barren desert, and the surrounding area, taken as a whole, yields considerable wealth in industrial minerals with gypsum and silica sand possibly leading the list in tonnage and value. The writer could dwell at considerable length on this interesting section of the country, for several years in the early 20's he was general superintendent of the now defunct White Star Plaster Co. that operated at Moapa, a few miles further up the Muddy river.

Existence of high grade silica sand in the foot hills westerly from Overton has been known for many years, and the first work directed towards exploiting this material was about 1928. There are now two silica sand producing plants in the district, the newest, largest, and most modern being the new plant built by Nevada Silica Sands, Inc. It replaces an older plant that has been in continuous operation here since 1935. The new plant, which embodies in its plans the results of experience gained during the many years of handling the Overton silica sands, was designed co-operatively by Leland S. Rosener, San Francisco, Calif., and engineers of the company. The plant, built under contract by Mac Isaac & Menke of Los Angeles, has a capacity of 25 t.p.h. It is expected to produce around 90,000 tons per year.

As most of our readers are well aware, glass sand to meet the present day rigid requirements must be of exceptional purity and have a grain size suitable for the trade. It's a comparatively low priced commodity so large deposits and tonnage figures must enter into the economics. The deposits of the company at Overton easily fill all these requirements with the finished product containing 99.6 (plus) in SiO_2, and it is expected the deposit will last upwards of 50 years or more. Before building the new plant, the company diamond drilled and proved an area 2000-ft. long, 400-ft. wide, and 200-ft. deep with excellent possibilities for extensions in contiguous zones not drilled. The deposit is about eight miles from the washing plant in Overton. It has about 3 ft. on the average of overburden, consisting of loosely cemented conglomerate and gravel that is removed by a 15-cu. yd. Le Tourneau carry-all powered by a DA-8 Caterpillar tractor.

High standards of quality have been set by the operators and a considerable investment has been directed towards reducing the iron content of the pit run sand from .04 per cent to .03 per cent. In other words, the entire new plant with all its varied equipment is built around a desire to remove at least 0.01 per cent of the objectionable iron. This can be better understood if it is realized that glass sand can be used with the higher iron content as the furnace operators can add certain reagents to de-colorize the melt. However, the more de-colorizer used, the more dead the finished products look. Glass made from silica sand low enough in iron to require no decolorizer or a minimum has sparkle and shine to it that commands a premium market price. This company therefore secured this type of raw material.



Installation view of sand sizer

Preliminary Treatment

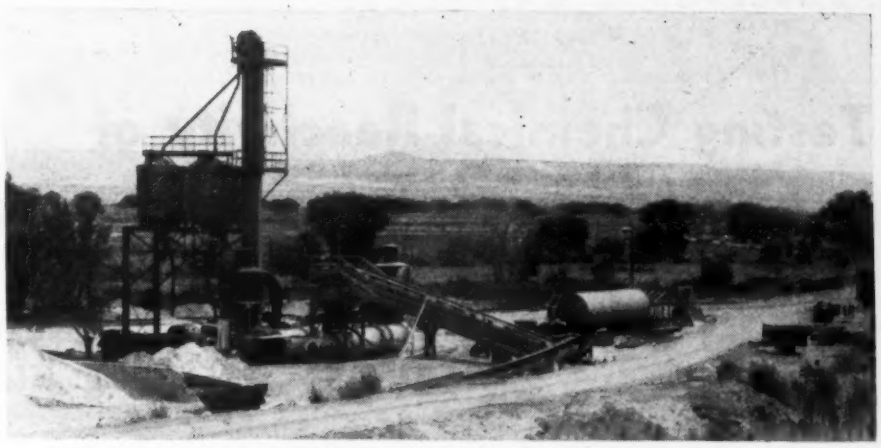
As pit run material contains some clay particles, the processing, whether wet or dry, involves scalping out and later washing out the clay, with the final product being tabled over a bank of 10 Wilfley concentrating tables to remove any remaining heavy iron particles.

The silica sand in the deposit is a loosely consolidated mass that for efficient pit operation has to be lightly blasted. Vertical drill holes, collared at 2½-in. diameter, are drilled to 20-ft. depths with Ingersoll-Rand Jackhammers and shot, using 40 per cent bag powder. A 2-cu. yd. Sauerman scraper powered by a 3-drum electric hoist delivers the material to a pit hopper. The material goes through a rotary grizzly having 1½-in. openings and the oversize is crushed in an 18- x 30-in. Allis-Chalmers jaw crusher. By the time the material has gone through the jaw crusher, it has disintegrated principally to fines except some of the clay particles. The crushed product and the fines from the grizzly are then elevated to a 5- x 12-ft., dry, rotary screen and the oversize, which is largely clay balls, is rejected. During dry weather the rotary screen has an ⅛-in. jacket but in wet weather a ¼-in. jacket is used. The total amount of oversize rejected, plus any rejections further along in the process, will amount only to about 5 per cent of the total feed, so while many rejections are made the metallurgical loss is small. The rotary screen is mounted over a 250-ton storage bin from which a fleet of 10-cu. yd. Kenworth, 10-wheel, Diesel dump trucks haul the material a distance of eight miles to the washing plant.

Washing Plant

At the plant the trucks discharge over a grizzly to a 20-ton truck hopper. A Stephens-Adamson reciprocating pan feeder delivers to a bucket elevator serving a 250-ton, steel, raw storage bin. The material in the storage bin is elevated to a 5- x 16-ft. rotary scrubber and scalper, having a short section of 16-mesh screen on the end of the scalper. The oversize is rejected. Throughs pass to a 4- x 10-ft. wet, Hum-mer screen having 30-mesh cloth, and again the oversize is rejected. Fines flow to a 15-ft. Dorr hydroseparator, and the overflow from this, containing mostly fine clay, is wasted. The underflow, or heavier particles, is then pumped to the top of the plant by a 4-in. Wilfley pump to a distributing tank serving two, six-cell, Dorrco hydraulic classifiers. This is a hindered settling device but with some special and very interesting refinements.

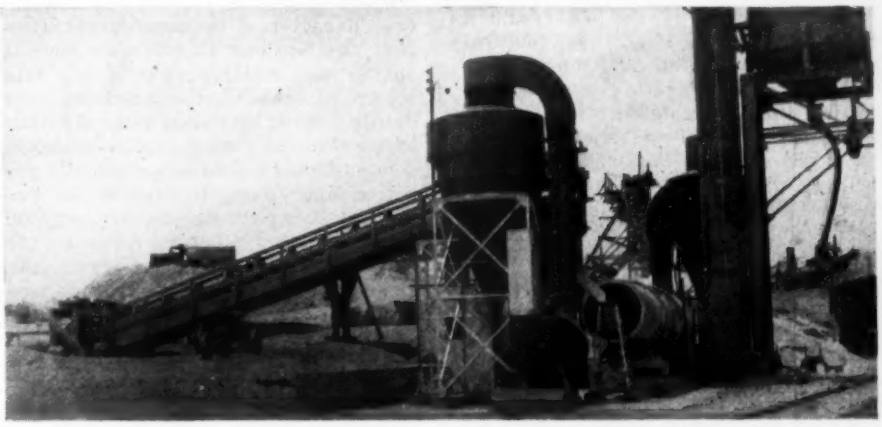
When solids in suspension in water are caused to settle against a rising stream of water, particles are classified due to their specific gravities, or sizes, or both. If a pocket is adjusted to maintain a large particle in suspension (or in "teeter") it will classify out a lighter or smaller particle. In this case as all the particles are of the same specific gravity, the device functions mainly as a classifier for size.



General view of dryer and loading bins

The Dorrco sizer consists of a tank divided into six pockets. By adjusting the velocity of the upward water in each compartment, particle sizes within a narrow range can be retained in that pocket and discharged allowing the lighter particles to overflow into the succeeding compartment. The part that is new on this classifier is the use of an automatic pressure regulator and power operated mechanism to control the discharge of each pocket. Heretofore such discharge, from this type of hindered settler, was through a hand controlled spigot or other devices that needed considerable attention by the operator. In this classifier, when the density of the pulp reaches a pre-determined figure, a Pressure-Trol Modulator functioning through

(Continued on page 134)



Close-up of cooler with cyclone and exhaust fan equipment of sand dryer installation

Dumping 10-ton Diesel truck into crusher hopper at older plant

Testing Chemical Reactivity of CONCRETE AGGREGATE

Latest method calls for crushing the aggregate to be tested in alkaline solution

By RICHARD C. MIELENZ and DUNCAN McCONNELL*

EXPERIENCE during the last decade has proved that many aggregates are attacked and altered by portland cement while they are enclosed in concrete. Consequently, aggregates should not be regarded merely as inert fillers contributing only bulk and weight to concrete. Originally described by Stanton in 1940,† the attack of alkalies (Na_2O and K_2O) released during hydration of high-alkali cements upon constituents of the aggregate is the most important kind of cement-aggregate reaction; and it may, and frequently does, cause rapid deterioration of concrete.

Investigations by the California State Division of Highways, the Bureau of Reclamation, and many other public and private agencies have proved that concrete deteriorating as a result of cement-aggregate reaction is wide-spread. Dams, buildings, bridges, highways, and other structures affected by this distress have been identified in California, Oregon, Washington, Idaho, Wyoming, Colorado, Nebraska, Kansas, Virginia, Arizona, and New York. Further investigation undoubtedly will reveal affected structures elsewhere. The absence of known occurrences of this kind of deterioration in certain portions of the United States should be regarded as a lack of information rather than as an indication that they do not exist.

The reactive constituents of aggregates comprise relatively few, but nevertheless widespread, rocks and minerals. They are opal, many volcanic rocks of acid to intermediate composition (high to medium silica content), silicate glasses (artificial or natural, excluding the basic types, such as basaltic glass), chalcedonic cherts (including most cherts and flints), some phyllites, and tridymite. In the United States, known deleteriously reactive aggregates occur along the courses of several major river systems, particularly the Colorado, the Snake, the Platte, the Republican, and the Salt-Gila Rivers.

*Petrographic Laboratory, Bureau of Reclamation, Denver, Colo.

†Stanton, T. E., **Expansion of Concrete Through Reaction Between Cement and Aggregate**, Proceedings, Am. Soc. Civil Eng., vol. 66, pp. 1781-1811 (1940).

Because cements which are low in alkalies are not always available and because some aggregates appear to be deleteriously reactive even with cements fairly low in content of alkalies, it is important that potential reactivity of aggregates be established before use.

Where an aggregate has been widely used in concrete construction, critical examination of existing structures may indicate the reactive or innocuous character of the aggregate. However, conclusions based upon such a survey are reliable only if all data regarding the kind of cement, mix design, curing methods, and conditions of service are available. For example, concrete containing a potentially reactive aggregate may show no evidence of cement-aggregate reaction for any of the following reasons: (1) Use of low-alkali cement, (2) insufficient age, (3) excessively porous condition of the concrete, or (4) lack of sufficient water to permit progress of the chemical reactions. Thus, an aggregate sucessfully used in one structure may prove to be deleterious in another, or deterioration may be confined to merely certain parts of a single structure. Conversely, concrete may fail in service for reasons other than reactivity of the aggregate. Thus, failure of concrete, as such, is no indication that the aggregate is unsound either physically or chemically. In many cases, complete service histories are not available in spite of the fact that the aggregate has been used for many years.

Deleteriousness of aggregates can be determined quantitatively in the laboratory by tests of mortar and concrete bars containing the high-alkali cements and the sand, gravel, or crushed rock on which information is desired. The occurrence of cement-aggregate reaction is indicated by expansion and decline in strength of the specimens and by the formation of siliceous gels, which occasionally exude from cracks. However, diagnostic evidences of reactivity commonly cannot be detected for several months, even though several methods have been used to accelerate deterioration. Thus, laboratory mortars and concretes cannot be relied upon to indicate quickly the deleteriousness of aggregates. On the other hand, to the present day, mortar and concrete bars are the most reliable indicator of reactivity, and reliability of other test methods must be evaluated by comparison with bar tests. Even service histories are usually less reliable.

The general unavailability and inconclusive character of service histories and the long time commonly necessary for determination of reactivity of aggregates by use of laboratory mortar and concrete bars led to attempts to develop indirect methods of determination not involving use of cement. The deleteriously reactive rocks and minerals can be identified by an experienced petrographer, and heretofore petrographic examination has been the only reliable indirect method for quickly determining deleteriousness. Consequently, all aggregates to be used in construction by the Bureau of Reclamation are examined petrographically to establish the necessity for restricting alkali content of cements. Petrographic examination is rapid, more than 200 aggregates having been examined in the Denver laboratories during a six-months' period in 1946. However, only a few petrographers have attained the experience necessary to perform these examinations; at best, their conclusions inevitably contain a large element of personal judgment.

Treat Aggregate Sample With Alkaline Solution

Many attempts have been made to establish a reliable chemical test of reactivity. To be suitable for this purpose, the test must give results which correlate the properties of a wide range of aggregate types with field service and laboratory experience. It should be applicable to the entire aggregate—both fine and coarse fractions—rather than to selected constituents, and should be subject to completion within a few days. Until now, no published chemical test has proved capable of reliably indicating the deleteriousness of aggregates.

Most encouraging of the proposed tests are those involving treatment of a prepared sample of aggregate material with alkaline solutions, and measurement of the degree of destruction which it suffers. It is reasonable to expect a relation between the deleteriousness of an aggregate and its ability to liberate silica into alkaline solutions, inasmuch as the expansion of concrete affected by cement-aggregate reaction is caused by osmotic pressures which develop within the alkalic silica gels formed during the reaction. Unfortunately, however, release of silica into solutions cannot be correlated straight-forwardly with deleteriousness. In previous leach tests of this type, dissolution of the aggregate material has been measured as the amount of silica held in solution, as weight loss of the sample, or as degree of etch of polished surfaces. In a general way, the aggregates which are most deleterious to concrete release more silica into solution, lose more weight, and etch more severely than do innocuous aggregates. On the other hand, a considerable number of highly deleterious aggregates actually are affected less than certain innocuous ones (Table 1).

Two reasons for this lack of correlation exist: (1) All of the silica released from the aggregate may not be dissolved in the caustic solution, but rather some variable proportion may be retained upon the particles; and (2) the ability of the aggregate to remove the available alkalies from solution varies greatly with the character of the aggregate material. It is possible that some aggregates are incapable of producing deleterious quantities of alkalic silica gel in concrete, not because they are chemically stable, but rather because of the limited amount of alkalies available in the cement; even so-called high-alkali cements rarely contain more than 1.50 per cent alkalies.

Crush Aggregate To Be Tested In Alkaline Solution

In the light of these concepts, tests were designed to measure not only silica dissolved from aggregate by an alkaline solution, but also the concomitant reduction in the strength (alkalinity) of the solution. In this test, the aggregate sample is crushed down and a portion of the material passing the No. 50 screen and retained on the No. 100 screen is treated in a molar solution of NaOH for 24 hours at 80 deg. C. The solution is then filtered and chemically analyzed for dissolved silica, and the reduction effected in the alkalinity of the solution is determined by titration with acid. In this way, both the effect of the solution upon the aggregate and the effect of the aggregate upon the solution are measured.

This test has been applied to approximately 70 different rocks, minerals, sands, and gravels which had been previously used as aggregate in mortars with low- and high-alkali cements. By simultaneous consideration of the amount of silica dissolved and the reduction in the alkalinity of the solution, the deleteriously reactive aggregates can be distinguished from the innocuous aggregates. In Fig. 1, the amount of silica dissolved in the NaOH solution (expressed as per cent by weight of the tested sample) is plotted against the reduction in alkalinity of the solution (expressed as per cent of the original concentration). The indicated aggregates are sands and gravels which have been used in construction. The points to right of the heavy, curved line represent sands and gravels which have caused deterioration of concrete through cement-aggregate reaction, and which cause mortar expansions greater than 0.1 per cent in a year. The points to the left of the line represent materials which are not associated with cement-aggregate reaction in structures, and which cause mortar expansion less than 0.1 per cent in a year. Only a few aggregates are indicated in Fig. 1, but the same line serves to separate all of the innocuous from the deleterious aggregates among the 70 materials tested. It will be noted that neither silica release nor alkalinity reduction alone is sufficient to determine reactivity. For example, the innocuous character of the tested sand from the Columbia river, in spite of its moderate silica release, can be predicted only if we note its large consumption of alkalies during progress of the reactions.

Operation of the test requires careful control, particularly of temperature, and the analytical procedures should be performed by a qualified chemist. In addition, interpretation of the results must be made with caution because reactions not related to silica release may cause some reduction in alkalinity of the NaOH solution.

In summary, although the reactivity of aggregates with high-alkali cement can be determined by study of concretes or mortars containing the aggregate, the determinations are usually time-consuming and may be unreliable. Reactivity of new aggregates can be estimated on the basis of a petrographic examination and comparison with aggregates whose reactivity is known, but the conclusions contain an element of personal judg-

(Continued on page 136)

TABLE 1: THE EXPANSION OF MORTAR BARS CANNOT BE PREDICTED FROM THE AMOUNT OF SILICA DISSOLVED FROM THE AGGREGATE BY AN NaOH SOLUTION.

Material	Dissolved Silica (Per Cent)	Expansion of Bars at 1 Year (Per Cent)
Quarts, near Denver, Colo.	0.19	.033
Sand, Kremmling, Colo.	0.44	.183
Sand, Columbia River, Wash.	0.53	.075
Sand, Kimball, Neb.	0.57	.382
Obsidian, Lake County, Ore.	0.58	.261
Sand, Mormon Flat Dam, Ariz.	0.60	.236
Glassy basalt, near Vantage, Wash.	0.79	.027
Gravel, Mormon Flat Dam, Ariz.	0.79	.226
Andesites, Cowlitz River, Wash.	1.41	.591
Pitchstone, Magdalena Mountains, New M.	1.98	.485
Chert, Joplin, Mo.	2.70	.214
Pitchstone, Georgetown, Colo.	3.24	.699
Opal, near Quincy, Wash.	6.23	1.613

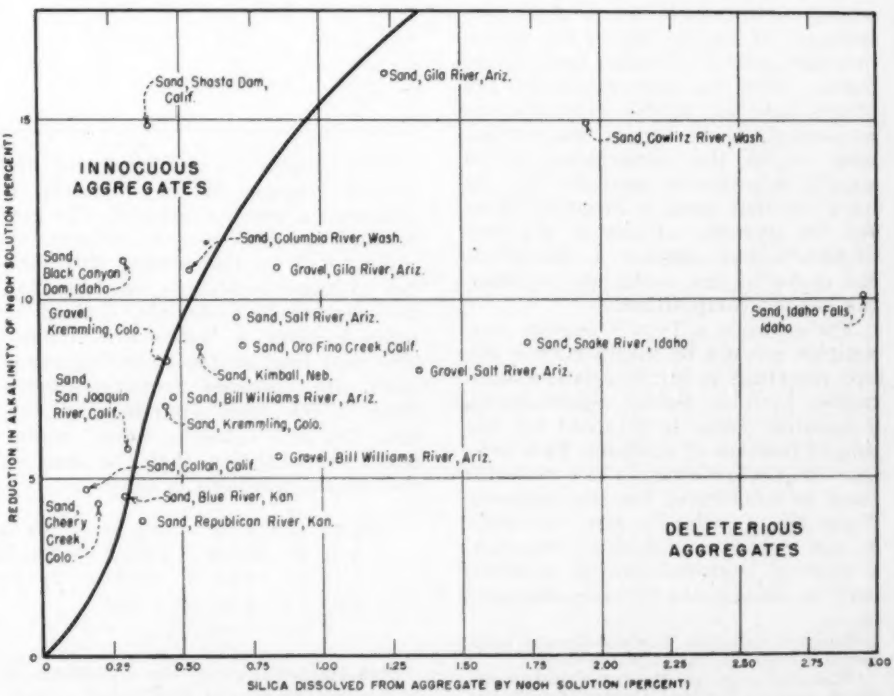


Fig. 1: Deleterious aggregates can be identified by the nature of their interaction with NaOH

"A Method of Designing Portland Cement Raw Mixtures"

Discussion of a paper by R. A. Loveland**

By L. A. DAHL*

THE interesting method of designing raw mixtures described by Mr. Loveland (ROCK PRODUCTS, September, 1947, p. 92) has advantages in certain types of problems. In each step in the procedure the computations are concerned with obtaining a desired percentage of a single component. It can therefore be seen in each step whether the desired percentage can actually be obtained from the raw materials considered in the computation.

For example, in the step in which he seeks to obtain 10 per cent C_3A the mixtures previously obtained have C_3A contents above and below 10 per cent, indicating that it is possible to obtain 10 per cent. If it is found at any step that the percentage of a component originally sought is not obtainable, there is opportunity to change the raw materials and start over without completing the computations, or to revise the desired composition to fit in with the possibilities with the materials at hand. In this respect, his method differs from the algebraic method, in which the possibility or impossibility of obtaining a desired composition is not known until the computation is completed. A negative value in the solution obtained by the algebraic method indicates that the desired composition can not be obtained from the raw materials. Mr. Loveland's method is therefore particularly suitable for problems in which the desired percentages of one or two of the oxides or compounds are decided upon at the outset, with the percentages of the others selected as the computations proceed. If there can be no compromise as to the composition to be sought, algebraic methods may be used. In that case, a negative value for the quantity of one of the raw materials may suggest a change in the choice of raw materials to obtain the desired composition.

For example, a Type V cement composition can not be obtained from the raw materials in Mr. Loveland's illustrative problem. Solved algebraically, a negative value is obtained for the weight fraction of diaspore. This indicates that a low-alumina raw material must be substituted for the diaspore. Since Mr. Loveland's raw materials do not include a high-silica material, a siliceous material low in alumina may be substituted for the diaspore, and it is then found that the Type V composition can be made. It is apparent, then, that the negative values sometimes obtained in an algebraic solution may be significant.

For some problems Mr. Loveland's method is to be preferred, while for others an algebraic solution is the logical choice. Since Mr. Loveland has not discussed the algebraic method, we believe it is in order to present some ideas on the subject.

The algebraic method of calculating proportions of materials in raw mixtures involves the solution of simultaneous equations. This is taught in high school and college algebra. However, the problems given are generally in terms of small whole numbers, and the solutions are whole numbers or simple fractions. The methods of elimination are suitable for such problems, but they do not immediately suggest procedures specifically applicable to the kind of problems in which we are concerned. The problem is not so difficult when a systematic procedure is followed, with checks at each stage of the computation. To illustrate, we will solve Mr. Loveland's problem algebraically, using the potential compositions, ignited basis, given in his paper. These are shown in the following table:

	v Limestone	w Clay	x Diaspore	y Pyrite Cinders	z High MgO Limestone	Sought
C_3S	255.4	—626.2	—565.5	—249.5	—53.2	50
C_2S	—167.2	668.8	472.4	234.9	119.2	
C_3A	3.3	39.9	135.9	—136.8	5.2	10
C_4AF	3.1	12.8	53.2	251.3	18.9	10
MgO	5.0	2.2	0.2	—	9.2	4.8

The symbol to be used for the weight fraction of each material is indicated above the material. The percentage sought for each compound is indicated in the last column. The number of these is always one less than the number of materials, and so no value is given to C_2S in this column. The first four of the following equations are obtained from successive lines in the table, omitting the C_2S line. The fifth equation merely represents the condition that the sum of the weight fractions is 1.000.

$$255.4v - 626.2w - 565.5x - 249.5y - 53.2z = 50 \quad (1)$$
$$3.3v + 39.9w + 135.9x - 136.8y + 5.2z = 10 \quad (2)$$
$$3.1v + 12.8w + 53.2x + 251.3y + 18.9z = 10 \quad (3)$$
$$5.0v + 2.2w + 0.2x + 9.2z = 4.8 \quad (4)$$
$$v + w + x + y + z = 1 \quad (5)$$

For the solution of the equations it is convenient to use quadruled paper, arranging the work in columns, as in Table 1. Equations 1-5 in Table 1 are those shown above, but the successive terms are in separate columns, with the right-hand members in the next to last column. The last column, or "check column," gives the sum of all of the terms of the equations, including the right-hand members.

Beginning with equation 9 in Table 1, all of the work is carried to four decimal places. This is sufficiently accurate for most purposes. However, if a calculating machine is used, five or six places can be carried without much trouble, to insure a high degree of accuracy.

The solution of simultaneous equations involves the successive elimination of variables. Since y is missing in equation 4, we eliminate y first. Equations 1a, 2a and 3a are obtained by multiplying equation 5 by the coefficients of y in equations 1, 2 and 3, respectively. By adding equations 1 and 1a we obtain equation 6, eliminating y. At the same time we add the check figures for equations 1 and 1a. Equation 6 is now tested by obtaining the sum of its terms, and this is found to agree with the check figure 308.0. This illustrates the checking procedure used throughout. It should be noted that the same operations are performed on the check figures as on the terms of the equations. Equation 7 is obtained and checked in the same manner. In the case of equation 8 we subtract equations instead of adding them, as indicated in the column headed "Operations," since the y terms in equations 3 and 3a are of like sign. Since we plan to eliminate z in the next step, we perform the subtraction in a direction to make the z term in equation 8 positive. This is not absolutely necessary, but if a calculating machine is used it is convenient.†

Carrying the column of check figures throughout the computations adds to the work. However, it gives confidence that each stage of the work is correct, and enables one to correct figures at the time that errors appear. Otherwise, it would be necessary to repeat all of the computations if the results were found to be in error.

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**Research engineer, Manufacturing Research Bureau, Portland Cement Association, after 22 years' experience in the portland cement industry.

†When the terms involving a variable to be eliminated are all of like sign, the alternate steps require subtraction only. The subtractions may be performed column by column, reducing the number of times that figures must be entered in the keyboard of the machine.

In equations 6, 7, 8 and 4, y has been eliminated, and the next step is to eliminate z. Each of these equations is divided by the coefficient of z, and this operation is also performed on the check figures. This gives us equations 9-12, in which the z terms are identical, and also check figures for these equations. Since in each equation there are five quantities to be divided by the same number, it is usually more convenient to multiply by the reciprocal. For example, equation 9 may be obtained by multiplying the terms in equation 6 by the reciprocal of 196.3. If a calculating machine is used, the reciprocal may be checked by setting it in the keyboard and then multiplying it by 196.3. Since the product should be 1.000, this provides a means of determining the position of the decimal point in subsequent multiplications by the reciprocal.

The remaining computations may be understood by referring to the explanations in the column headed "Operations." Some additional remarks concerning use of the check figures may be helpful, however. It will be noted that the work is in alternate steps, one requiring subtraction (or addition), and the other requiring division (or multiplication by a reciprocal). In the steps involving subtraction the sum of the terms of an equation should agree exactly with the check figure. An error in sign of one of the terms will cause the sum of the terms to differ from the check figure by an amount equal to twice the coefficient of the term in error. For example, if the x term in equation 6 were written as $+316.0$ instead of -316.0, the sum of the terms would be 2×316.0, or 632.0 greater than the check value. If any figures have been transposed, or if a decimal point has been incorrectly placed, the difference between the sum of the terms and the check value will be divisible by 9. Examination of departures from check values is of considerable importance in locating errors.

In the steps involving division, errors are introduced through dropping decimals. Such errors are small, and compensate one another to such an extent that departures from check values seldom exceed one point in the last figure. For example, in obtaining equation 12 from equation 4, we divided the check figure, 21.4, by 9.2, obtaining 2.3261. The sum of the terms of equation 12, is 2 3260. The check figure was corrected to agree with the sum of the terms. This correction is always made when such small departures occur, to avoid confusion in the steps which follow. Larger departures from check values are examined in the same manner as in the steps involving subtraction.

The weight fractions of materials obtained by Mr. Loveland's method or by the algebraic method are expressed on an ignited weight basis. To convert to an unignited, or raw, weight basis, each weight fraction should be divided by 100 minus the ignition loss of the material.

Operate Complete Dredge

WARNER CO., Philadelphia, Penn., will soon be operating a new dredge, the Franklin, which will complete the entire process of not only dredging the material from the river but also washing, crushing and screening. Plans now call for the production of concrete and plastering sand, ¾- and 1½-in. gravel, with possible conversion of its entire gravel production to ¾-in. size. The Franklin will be fitted with two settling tanks, one each for concrete and plastering sand. Gravel will be screened over two Allis-Chalmers vibrating screens, with oversize being conveyed to a 4¼-ft. Symons cone crusher. To supplement the barge's present steam engines, additional power will be supplied by a diesel powered generator.

Built in 1927 by Dravo Corp., the dredge was operated in the Allegheny river by the Pittsburgh Plate Glass Co. to produce finished sand. Later it was found more economical to buy this sand on the open market, and the dredge was idle for six years before being purchased by the Warner Co.

In order to enable the boat to produce more than just sand, much machinery was added and it became necessary to increase the hull's width by 12 ft. to obtain the added buoyancy needed. Since it is necessary to move the dredge from Pittsburgh to Philadelphia by water, the trip will take it down the Ohio and Mississippi to New Orleans; around Florida and up the Atlantic coast to the Delaware river. The voyage of the Franklin is scheduled for about November so as to take advantage of favorable weather; and dredging operations are scheduled to commence by spring of 1948.

Road Stone from Strip Mine

HANNA COAL CO., Georgetown, Ohio, a subsidiary of Pittsburgh Consolidated Coal Co., is producing 2000 tons of agricultural limestone and road stone daily as a by-product of its strip mining operation. Large crushers have been installed to handle limestone boulders uncovered in the coal mining operation.

Table 1.—Solution of Equations

	Operations						Check
1		$255.4v - 626.2w - 565.5x - 249.5y - 53.2z$				50.	−1189.0
2		$3.3v + 39.9w + 135.9x - 136.8y + 5.2z$				10.	+ 57.5
3		$3.1v + 12.8w + 53.2x + 251.3y + 18.9z$				10.	+ 349.3
4		$5.0v + 2.2w + 0.2x + 9.2z$				4.8	+ 21.4
5		$v + w + x + y + z$				1.	+ 6.
1a	(5) × 249.5	$249.5v + 249.5w + 249.5x + 249.5y + 249.5z$				+ 249.5	+1497.0
2a	(5) × 136.8	$136.8v + 136.8w + 136.8x + 136.8y + 136.8z$				+ 136.8	+ 820.8
3a	(5) × 251.3	$251.3v + 251.3w + 251.3x + 251.3y + 251.3z$				+ 251.3	+1507.8
6	(1) +(1a)	$504.9v - 376.7w - 316.0x + 196.3z$				+ 299.5	+ 308.0
7	(2) +(2a)	$140.1v + 176.7w + 272.7x + 142.0z$				+ 146.8	+ 878.3
8	(3a) −(3)	$248.2v + 238.5w + 198.1x + 232.4z$				+ 241.3	+1158.5
4	(4) repeated	$5.0v + 2.2w + 0.2x + 9.2z$				+ 4.8	+ 21.4
9	(6) + 196.3	$2.5721v - 1.9190w - 1.6098x + z$				+1.5257	+1.5690
10	(7) + 142.0	$.9866v + 1.2444w + 1.9204x + z$				+1.0338	+6.1852
11	(8) + 232.4	$1.0680v + 1.0262w + .8724x + z$				+1.0383	+4.9849
12	(4) + 9.2	$.5435v + .2391w + .0217x + z$				+ .5217	+2.3260
13	(10) −(9)	$-1.5855v + 3.1634w + 3.5302x$				— .4919	+4.6162
14	(10) −(11)	$-.0814v + .2182w + 1.0680x$				— .0045	+1.2003
15	(11) −(12)	$+ .5245v + .7871w + .8307x$				+ .5166	+2.6589
16	(13) +3.5302	$-.4491v + .8961w + x$				— .1393	+1.3077
17	(14) +1.0680	$-.0762v + .2043w + x$				— .0042	+1.1239
18	(15) + .8307	$+ .6314v + .9475w + x$				+ .6219	+3.2008
19	(16) −(17)	$-.3729v + .6918w$				— .1351	+ .1838
20	(18) −(17)	$+ .7076v + .7432w$				+ .6261	+2.0769
21	(19) + .6918	$-.5390v + w$				— .1953	+ .2657
22	(20) + .7432	$+ .9521v + w$				+ .8424	+2.7945
23	(22) −(21)	$+1.4911v$				+1.0377	+2.5288

		Wt. fractions, ignited weight basis
Eq. 23, v =	$1.0377 + 1.4911$	= .6959 (Limestone)
21, w =	$-.1953 + .5390v$	= .1798 (Clay
17, x =	$-.0042 + .0762v - .2043w$	= .0121 (Diaspore)
12, z =	$.5217 - .5435v - .2391w - .0217x$	= .1002 (High MgO limestone)
5, y =	$1 - v - w - x - z$	= .0120 (Pyrite cinders)

Regional Meetings A Big Success

National Sand and Gravel Association and National Ready Mixed Concrete Association directors meet at French Lick, Ind.

MEMBERS of the Board of Directors of the National Sand and Gravel Association, at their mid-year meeting, French Lick Springs, Ind., August 12, were brought up to date on the progress made by the Association in many directions. One of the activities recently inaugurated of holding regional meetings of Association members and invited producer guests was especially commended; and results of these meetings already held prove the value of taking the Association to many who for one reason or another are unable to attend the annual conventions.

These regional meetings have been in the nature of round-table discussions of the problems of the industry and the activities of the Association, and they provide ample opportunity for questions and answers. So far, the Association has been represented at these regional meetings chiefly by Executive Secretary V. P. Ahearn, who has had a rather strenuous itinerary. Alternate meetings are planned in which Stanton Walker, director of engineering, will talk about the research work of the Association. It is difficult for both men to be away from the Washington office at the same time, and the director of engineering has many scientific society and committee meetings to attend.

The meeting was opened by a short resumé of present conditions in the industry by RICHARD N. COOLIDGE, president of the Association and chairman of the board. He said the Los Angeles convention of the Association last March was the high point in its history and again paid tribute to Robert Mitchell, past-president, and the other California producers who did so much to make the convention the most memorable one.

Mr. Coolidge said, among other things, that one of the most serious problems facing the industry in many years was the present shortage of open-top car railway equipment, and the prospect that this short supply would continue through the fall and winter. Another railway problem is the expected increase in freight rates. Mr. Coolidge said that private construction was lagging behind expectations, but on the whole the industry seems quite active. He paid tribute to the Association staff for its helpfulness, especially for aid given members in meeting labor problems, and for engineering assistance.

Convention Dates and Programs

The date and place of the 1948 convention have already been announced —Netherland-Plaza Hotel, Cincinnati, Ohio, the week of January 19, with an exhibit of new machinery and equipment. The 1948 mid-year meeting of the Board of Directors will be held at the Broadmoor Hotel, Colorado Springs, Colo., in September. The 1949 convention will be in New York City, the 1950 at Chicago or St. Louis, probably; and in 1951 at New Orleans. It is necessary these days to plan conventions well in advance because of the congestion of hotel space. Exhibits will be held only in alternate years—1948 and 1950.

The directors had few suggestions to offer on convention programs. The round-table discussions of operating and technical problems and on labor developments have proved eminently satisfactory, and will be continued. The main issue in 1948 is dovetailing the National Sand and Gravel Association program with that of the National Ready-Mixed Concrete Association, and providing adequate time for the exhibit.

Engineering and Research

STANTON WALKER, director of engineering, reported on a survey of concrete pavements and highway structures in the Carolinas, the results of which led him to believe that disintegration of concrete from the reaction between high alkali cements and certain coarse aggregates may be more widespread than it has been customary to believe. Anyway, something is happening to concrete structures in these states that is of very serious concern to all interested in the use of concrete. He mentioned briefly other research on highway concrete in cooperation with state highway departments and the National Crushed Stone Association.

Research at the University of Maryland under the Stanton Walker fellowship was described briefly. The University has a new engineering building under construction in which space is being provided especially for the fellowship research. Incidentally, Mr. Walker has been appointed a regular member of the faculty of Harvard University to give an annual lecture and short course on concrete design. The details of the Association's own short course for its members' technical employes, conducted annually at the University of Maryland, were discussed. It is planned to have rather specialized courses every other year, with a broader course on fundamentals in the alternate years, to meet the requirements of men in various categories. The 1947 course will be held the week of November 17.

Freight-Rate Issue

After considerable discussion, T. E. POPPLEWELL, chairman, reported for a special committee on the freight-rate increase issue, which was finally resolved by a motion made by JOHN PRINCE and seconded by R. E. WEAVER, unanimously adopted, as follows:

"(1) The National Sand and Gravel Association should participate in Ex Parte 166, and, while indicating a friendly interest in increasing railroad revenues, should oppose any increase in sand and gravel rates in view of the fact that existing rates are driving business away from the carriers.

"(2) The Association should advise the Commission that if, irrespective of our data showing the trend away from the railroads and to the trucks and water, the sand and gravel industry must accept some increase in rates, such an increase in sand and gravel rates should be expressed as a percentage with a maximum in flat cents per ton.

"(3) The Association should advise the Commission that the increase in proposed Eastern territory, 25 per cent with a maximum of 20 cents per ton, is a logical grouping; in other words, there is a sound relationship between a percentage increase of 25 per cent and a flat increase of 20 cents.

"(4) The Association should say to the Commission that if the carriers should get less than 25 per cent the flat increase should be correspondingly reduced in order to maintain the relationship of 25 per cent and 20 cents.

"(5) The Association should advise the Commission that the increase proposed in Southern and Western territories, namely 15 per cent, should carry a maximum of approximately 12 cents per net ton.

"The Association should associate itself with organizations of allied industries in its participation in Ex Parte 166 if the principles here rec-

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Sand and Gravel Directors

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ommended to the Board of Directors are acceptable to such other organizations."

Legislative Problems

V. P. AHEARN, executive secretary, discussed the effect of the Taft-Hartley Act on the industry. He had obtained the expert advice of Charles A. Horsky, the Association's legal counsel. The part that aroused the most interest, and a point which apparently was not fully understood, is that existing closed-shop contracts (those entered into prior to June 23, 1947) may continue if the contract provides for their continuance for a period of years, but if they are reopened for any reason and a new contract is written, all closed-shop provisions are now (after August 23) illegal. This has the effect of giving employes the choice of keeping their closed-shop contract which may run for two or more years, or writing a new contract, say for a pay increase, and losing the closed-shop provisions.

Mr. Ahearn also outlined the results of a progress report on a 1947 wage survey in the industry. There was considerable discussion as to the value of this survey. The opinion seemed to be that the members in general were more interested in wage rates in local competitive industries than in rates in their own industry in widely separated parts of the country. This difference of opinion is partly due to the variety of classifications for the same plant job, and the fact that different operators deal with different labor unions for the same job in numerous instances.

Board Elects an Honorary Member

At the luncheon meeting the chairman sprang a very pleasant surprise on the writer of these lines. President Coolidge, after some complimentary remarks, introduced ROBERT MITCHELL, who made some further complimentary remarks, and then proposed a motion to elect Nathan C. Rockwood an honorary member of the Board of Directors. The motion was seconded by W. AGNEW BLISS and by ALEX. FOSTER, JR., and therewith adopted. The man thus honored has the distinction of being the first honorary member of the Board and second honorary member of the Association, the first being the late Edmund Shaw.

Directors Present

Those present, including a few guests were: R. N. Coolidge, chairman, Nashville, Tenn.; V. P. Ahearn; H. D. Bellamy, Waterloo, Iowa; W. A. Bliss, Pittsburgh, Penn.; H. P. Caldwell, Louisville, Ky.; Otto S. Conrades, St. Louis, Mo.; Alex. Foster, Jr., Philadelphia, Penn.; F. C. Fuller, Portsmouth, Ohio; E. J. Goes, Milwaukee, Wisc.; Abe Goldberg, Milwaukee, Wisc.; Paul C. Graham, Los Angeles, Calif.; Robt. Mitchell, Los Angeles, Calif.; Wm. Moore, Boston, Mass.; G. S. Monroe, Portsmouth, Ohio; John W. Murphy, Spokane, Wash.; M. A. Neville, Lafayette, Ind.; T. E. Popplewell, Fort Worth, Texas; John Prince, Kansas City, Mo.; G. W. Renwick, Chicago, Ill.; Don D. Reynolds, Boston, Mass.; Nathan C. Rockwood, Chicago, Ill.; Louis C. Schilling, Miami, Fla.; A. R. Shiely, St. Paul, Minn.; F. P. Spratlen, Jr., Denver, Colo.; Stephen Stepanian, Columbus, Ohio; Wm. J. Stewart, Kansas City, Mo.; Ray V. Warren, Pittsburgh, Penn.; Stanton Walker; and R. E. Weaver, Lincoln, Ill.

Ready Mix Directors' Meeting

MEETING at French Lick Springs, Ind., for their midyear Board of Directors' business session of the National Ready-Mixed Concrete Association, the members heard a report of progress on projected research at the University of Maryland; and on a motion made by ALEX. FOSTER, JR., and unanimously adopted, the Board named the new research fellowship, the Stephen Stepanian Fellowship, in honor of the inventor of the concrete truck-mixer, and a fellow member of the Board. The Association has not been able yet to find a satisfactory candidate for the fellowship, but when a likely young engineer is found he will have two years' post-graduate study on some of the technical problems of the industry.

FRANK P. SPRATLEN, JR., president of the Association and chairman of the board, briefly reviewed the continued progress of the Association, which now has 226 active members. He mentioned particularly the success of the regional meetings which have been held in conjunction with those of the National Sand and Gravel Association during the current year. He suggested two such meetings in each region a year, one to feature the executive secretary and his work and the other the director of engineering and his work.

V. P. AHEARN, executive secretary, reported on plans and program for the 1948 annual convention at Cincinnati, Ohio, the week of January 19, and discussed the places and dates of future conventions. Since these things are reported in the preceding article on the board meeting of the National Sand and Gravel Association, they are not repeated here.

Boycotts Illegal Now

Mr. Ahearn also discussed in some detail the effects of the Taft-Hartley Act, the Portal-to-Portal Pay Act, and other federal laws and regulations on the ready-mixed concrete industry. One thing in particular is emphasized and this is that the Labor-Management Relations Act of 1947 (the so-called Taft-Hartley Act) actually broadens the coverage of "interstate commerce." If a ready-mixed concrete manufacturer is using cement from outside his state or servicing work which affects interstate commerce, and that includes practically every one, he is definitely under the Act, even though he may not be under the Fair Labor Standards Act (the so-called Wage and Hour Law).

Another feature of the Taft-Hartley Act of especial interest to the ready-mixed concrete industry, is the provision which makes it an unfair labor practice for a labor organization to "engage in, or induce or encourage the employes of any employer to engage in, a strike or concerted refusal in the course of their employment to use, manufacture, process, transport or otherwise handle or work on any goods, articles, materials, or commodities, or to perform any services, where an object there of is: (A) forcing or requiring * * * any employer or other person to cease using, selling, handling, transporting, or otherwise dealing in the products of any other producer, processor, or manufacturer, or cease doing business with any other person; * * *."

According to an opinion received by Mr. Ahearn from the Association's legal counsel, CHARLES A. HORSKY, this provision makes boycotts against the use of ready-mixed concrete, which labor unions in some few localities have established, very definitely a matter which can be corrected under the law. However, it has not been, nor is it likely to be, the policy of the Association to take the initiative in any such controversy. It is in a position to provide advice and suggestions to individual members who are faced with this problem.

Engineering Matters

STANTON WALKER, director of engineering, said the demand for local group meetings was greater than the Association could possibly meet with its present personnel, unless the local groups would do practically all of the "spade work." The Association staff was ready, he said, to give every assistance in making up programs, outlining the courses, etc., but if it attempted to fill all requests for promoting and directing such local group meetings it would have time for little else.

Other things Mr. Walker discussed informally were the new revised A.S.T.M. specifications for ready-mixed concrete, the plans for revision of the "Manual" of the Association and the booklet on "Control of Quality of Ready-Mixed Concrete," the Research laboratory and the fellowship at the University of Maryland, current research, etc. Among the latter is a study of the effect of admixtures, of hot cement, and the effect of gap grading in aggregates on concrete mix

(Continued on page 126)

Ready Mix Directors Meeting

(Continued from page 118)

design. The new Manual, to be published by the Association, he said, would be more comprehensive than either or both the older books.

Directors and guests present were: Frank P. Spratlen, Jr., Denver, Colo., president of the Association and chairman of the board; V. P. Ahearn; W. A. Bliss, Pittsburgh, Penn.; Glen C. Cook, Louisville, Ky.; Geo. C. Eady, Louisville, Ky.; N. J. Fredericks, Detroit, Mich.; Alex. Foster, Jr., Philadelphia, Penn.; C. Dolly Gray, Indianapolis, Ind.; R. K. Humphreys, San Francisco, Calif.; A. W. Kimmel, Dayton, Ohio; J. F. McCracken, Louisville, Ky.; Ray McLean, Columbus, Ohio; Wm. Moore, Boston, Mass.; John W. Murphy, Spokane, Wash.; T. E. Popplewell, Fort Worth, Tex.; John Prince, Kansas City, Mo.; Robt. F. Porter, Towson, Md.; D. D. Reynolds, Boston, Mass.; J. W. Roberts, Richmond, Va.; Nathan C. Rockwood, Chicago, Ill.; L. C. Schilling, Miami, Fla.; A. R. Shiely, St. Paul, Minn.; W. J. Stewart, Kansas City, Mo.; W. F. Tews, Milwaukee, Wis.; H. F. Thomson, St. Louis, Mo.; W. E. Trauffer, Chicago, Ill.; and Stanton Walker.

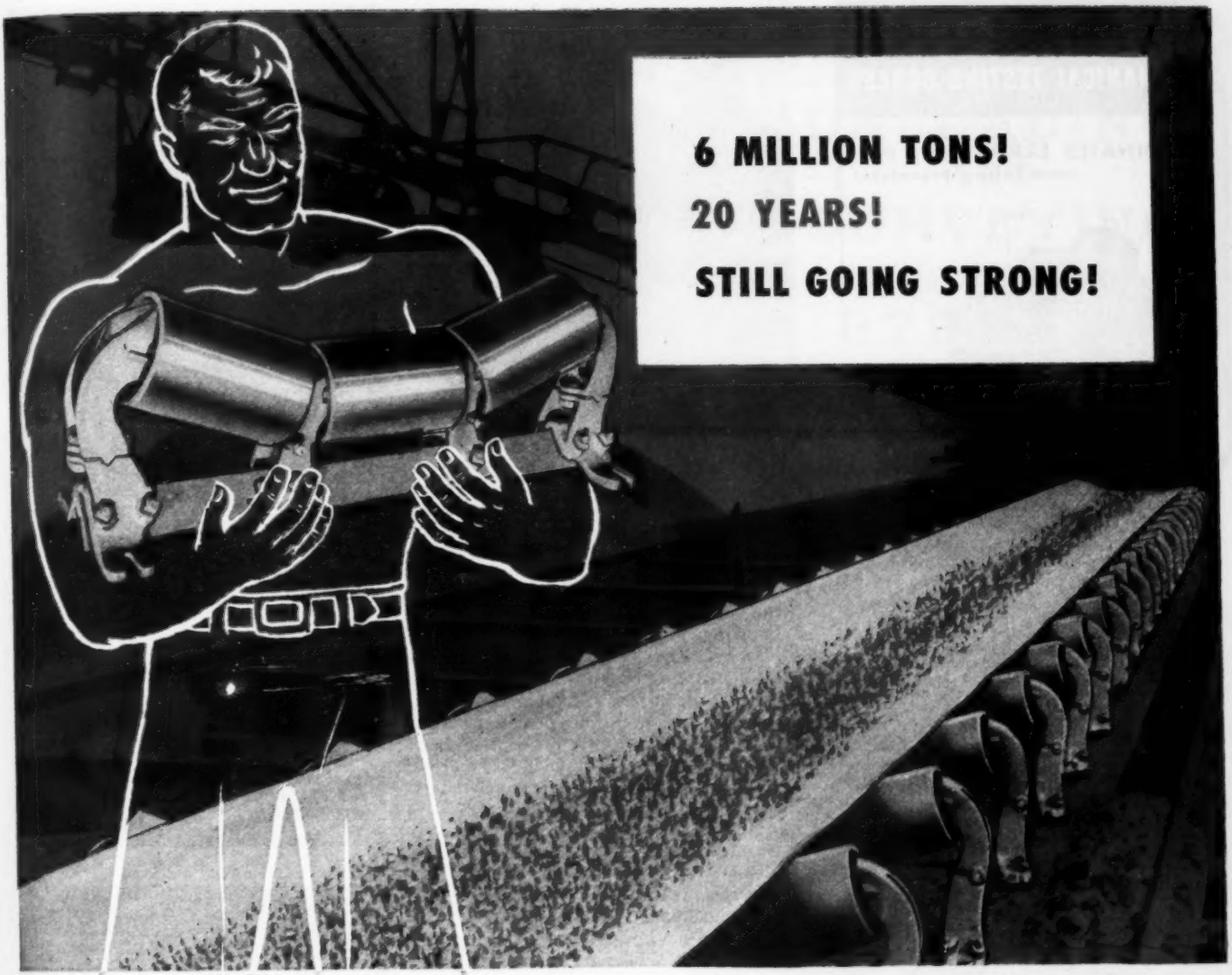
Stone Association Outing

NEW YORK STATE CRUSHED STONE Association, Inc., held its annual outing September 4 at Schuyler Meadows Golf Club, Loudonville, Albany, N. Y., with more than 150 members, associates and guests in attendance. Following the precedent set in earlier years, a 12:00 o'clock noon cocktail party was followed by a buffet luncheon. The afternoon was given over to sports, ranging all the way from golf and horseshoes to bridge and other card games.

The golf was highlighted by a contest between two ten-man teams; with the association team, captained by W. P. Foss, Jr., New York Trap Rock Corp., the victor over the Public Works Department team captained by C. H. Sells.

British Cement

IN A RECENT ADDRESS before the annual general meeting of the Rugby Portland Cement Co., Halford W. L. Reddish, chairman and managing director, stressed the necessity for increased output through harder effort. Mr. Reddish pointed out that deliveries of cement by the whole industry in the home market showed an increase in 1946 of 62 per cent over 1945, but were still some two million tons below the total for 1939. British Cement Makers' Federation, in anticipation of further recovery in 1947, late last year announced a reduction of 2s. per ton in the price of cement; despite a continued rise in many direct costs of production.



Since 1926 this S-A Conveyor system, on the Pine Ridge Coal Co., Detroit waterfront dock, has unloaded, stored, screened and delivered coal... with practically no repairs. It's still good for millions more tons.

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The idlers or carriers on which the Pine Ridge Conveyor belts travel are Sacons. Live shafts turn with rollers in ball bearings to save bearing travel, and starting and running power. The bearings are enclosed in self-aligning housings, with dust and weather tight labyrinth grease seals. They are built to take punishment... in this case, millions of tons... with practically no repairs or replacements.

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BULK MATERIAL HANDLING EQUIPMENT

Dry screen, above, with cone crusher below for secondary reduction

Conveying

(Continued from page 99)

ment. This consists of an inclined belt conveyor mounted on a track to facilitate movement of the assembly. The unit is mounted so trucks can dump to the steel hopper feeding the belt and each size of stone placed in its proper pile. The piles must also be kept separate by suitable bulk heads. The stacker which is moved back and forth on the track is powered by a D4600 Caterpillar Diesel electric unit. The aggregates in these stock piles are then transferred to the top of the batching plant by a Lima crane using an Owens clamshell bucket.

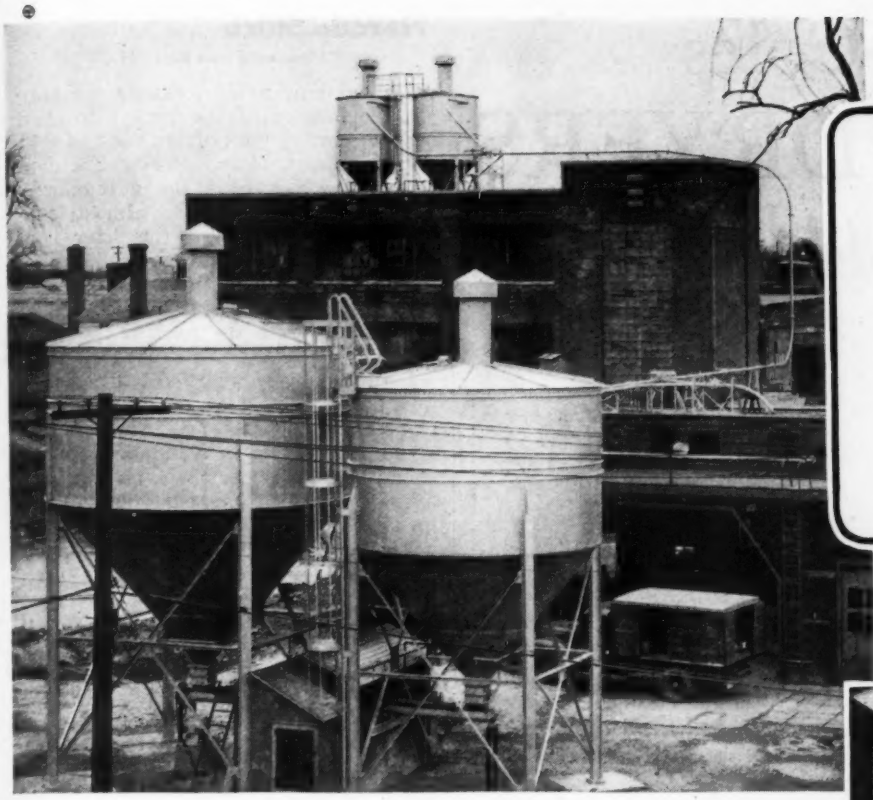
Over the batching plant are four steel bins for the aggregate. Bulk cement is delivered from the smaller of the two silos by screw conveyors. There are two weighing hoppers, one for the stone and one for the cement. Weighing is entirely automatic. The Kron dial scales have five settings.

Official personnel includes: T. C. Latham, district manager; Geo. Cole, sand and gravel plant superintendent; and Louis Mushaney is in charge of the "hot" plant.

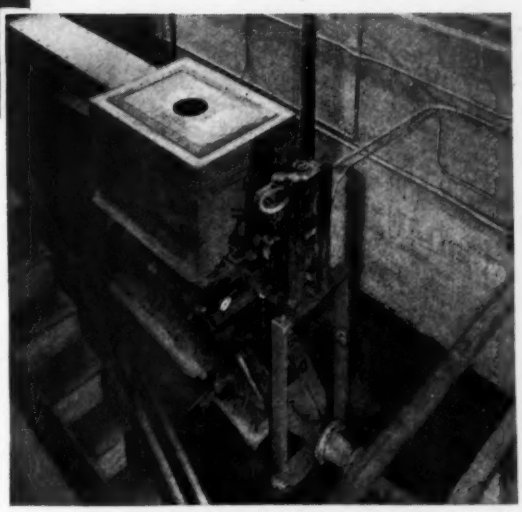
Truck dumping to hopper over 15- x 38-in. jaw crusher

Plants handling Cement, Lime, Gypsum, Sand, Gravel, Crushed Stone, etc., use the WEIGHTOMETER for fast, accurate production.

WEIGHTOMETER gives a continuous, automatic, and accurate weight record of materials in transit at an extremely low operating cost. All producers of bulk materials handled by belt conveyors need this dependable check on production figures supplied by MERRICK WEIGHTOMETER.



UNLOADING AND CONVEYING TO STORAGE AND PROCESS

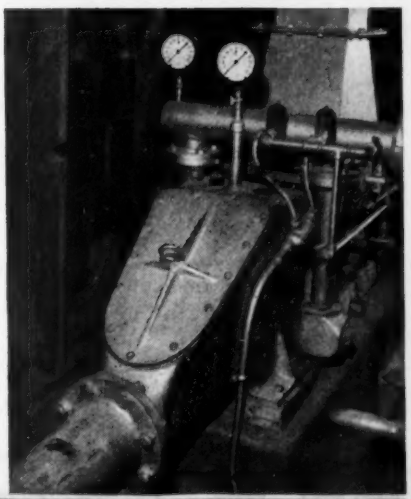


FULLER-KINYON SYSTEMS INSTALLED TO MEET CONDITIONS OF PLANT LAYOUT

The Fuller-Kinyon System illustrated is used for unloading and conveying cement and precipitator dust for the manufacture of asbestos shingles. The system was purchased and installed after the plant had been erected, and, therefore, had to be engineered and built to fit in with the existing building layout.

There are really two systems installed. One system unloads materials from hopper-bottom cars, upper photo right, and conveys materials to the two storage bins, foreground upper photo, or through the use of a two-way valve in the conveying line, direct to process bins shown on building. Materials are also conveyed from storage bins to process bins by another Fuller-Kinyon Pump, housed in the building underneath the storage bins. This pump is shown in photo, lower right.

A very flexible and simple system, economically possible only with a Fuller-Kinyon System. When your problem is conveying of dry pulverized materials, get in touch with us. Our engineering department is at your service.



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FULLER-KINYON, FULLER-FLUXO AND THE AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES . . . ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AIR-QUENCHING INCLINED-GRATE COOLERS . . . DRY PULVERIZED-MATERIAL COOLER . . . AERATION UNITS . . . MATERIAL-LEVEL INDICATORS . . . MOTION SAFETY SWITCH . . . SLURRY VALVES . . . SAMPLERS

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Nevada Silica

(Continued from page 111)

a wheatstone bridge, causes the trap in the bottom of the pocket to open and discharge part of the sand in that compartment, thus lowering the density, at which time the gate closes. The discharge appears almost continuous. This part of the sizer is a development of the Honeywell Co.

The sizer compartments are trapezoidal in plan, the area of each pocket increasing from the feed to the overflow. The pockets are separated from each other by submerged baffle plates, and are provided at the bottom with constriction plates perforated and spaced to maintain a balanced condition in each pocket when correlated with the size of the particle retained in that pocket. Water under pressure is introduced into the compartment with control through a pinch valve. Glass windows are provided on one side of the machine for observation of conditions in each pocket.

The final overflow from the Dorrco sizer contains about 9 tons per 24 hours of very fine silica sand of a grade sufficiently low in iron to not need tabling.

"Presizing" Improves Tabling Results

Six different sizes of material can be prepared with this sizer, the sizes being distributed over the concentrating tables so that a table, or group of tables, will each receive a one-size feed. Or the spigot products can be combined in almost any way desired and the combined material sent to tables. However, having a sized feed for such tables is often an advantage in that it offers a uniform grain size to the flow of water over the rifflededeck of the table, which along with the other operating factors, speed, length of stroke, slope of table, etc., lends itself to better metallurgical results.

The ten Wilfley tables are intended to remove any of the heavier iron particles in the feed and reduce the ferrous content, as previously mentioned, from .04 to .03 per cent iron. The iron portion comes off as the concentrate streak and is wasted. That section on the table normally classed as a middling contains the minus 30-, plus 140-mesh sand. The balance of the table, which in most operations would be classed as a tailing, contains the minus 140-mesh sand.

These two sand products pass to individual Dorr rake classifiers. A system of belt conveyors elevates and discharges the rake classifier products to the wet storage slab. Overflow waters from the rakes are returned by pump to the scrubber.

Wet storage is over a concrete slab 60- x 200-ft. divided into two sections, one 60 ft. long for the finer sand, and the balance of the area for the coarser material. The top of the slab is about at ground level, and is covered by 18-in. of gravel that allows the sand to drain down to about 5 per

cent moisture. Sands in either of these stockpiles are reclaimed by an electric "slusher" that delivers to a small moveable hopper straddling a horizontal conveyor belt located at the long axis to the slab. This hopper can be moved along the belt as it is mounted on four small car wheels and rides a track with rails laid on the floor on each side of the reclaiming belt. This belt discharges to a cross belt serving a 20-ton capacity feed hopper ahead of the drier.

All the conveyor galleries at the storage pile are of steel construction and use G. F. Goodrich belts that ride Stephens-Adamson carrier rolls. Hot material from the drier, which is 5 ft. in diameter and 30 ft. long, is moved by a short bucket elevator to a cooler of similar size. The cooler and drier are provided with a B. F. Stutervant Co. exhauster that pulls the dust into cyclone dust collectors. Dried products and the dust from the cyclones passes to a 70-ft. bucket elevator which delivers the finished products into two cylindrical track-loading hoppers that straddle the railroad track. Cars are loaded from the top from these two bins. The driers, which were supplied by the Mutual Engineering Co., are driven by 10-hp. G. E. motors through a Western Gear Works reducer and roller chains. The drier is oil-fired, using twin sets of Geo. D. Roper Co. oil pumps that deliver to oil burner.

Muddy river supplies water for the plant, flowing through a ditch to a 3,000,000 gal. storage pond. Water is taken from this pond by two of three centrifugal pumps, one being held as a spare. Byron-Jackson and Ingersoll-Rand pumps are used with a Kimball-Krogh for a booster. Tailings from the washing plant flow through an 8-in. pipe line, 900 ft. long, to a retaining pond.

The over-all management of Nevada Silica Sands, Inc., is carried out by F. W. McDonald, vice-president and general manager of Glass Containers, Inc., a subsidiary of Fibreboard Products, Inc. Mr. Fred Morledge is general manager with headquarters at Overton. V. Hickman is assistant manager. About 20 men are employed.

Solving Lime Problem

(Continued from page 102)

shrink more than the cooler inside, if bonding is weak, spalling occurs resulting in the production of much fines and defeating any effort to charge the kiln with uniform stone. The spalling occurs in the high temperature strata of the kiln which then becomes tight packed walls interfering greatly with distribution and mix-

Only low temperature and uniformity attained through proper recirculation, frequent drawing and proper trimming will help this situation, and when the correct condition is attained and maintained, a looser state will prevail through the kiln and the mixing will be far better without resorting to exceptional means.

Alkali Problem

(Continued from page 113)

ment and are reliable only if the petrographer is experienced in problems of concrete. Leach tests involving treatment of the aggregate material with alkaline solutions, and measurement of the dissolution of the material heretofore have been unsuccessful. However, recent work in the laboratories of the Bureau of Reclamation has shown that deleteriousness can be predicted from leach tests if both the amount of silica dissolved from the aggregate and the reduction in alkalinity of the solution are determined.

When applied to 70 different rocks, minerals, sands, and gravels, the new test has proved successful in separating innocuous aggregates from those which react deleteriously with high-alkali cements. The method is amenable to incorporation in acceptance testing procedures because the sample can be prepared, the test run, and the necessary chemical analyses completed in three work-days.

Acknowledgements

The writers wish to express their gratitude for helpful discussions, suggestions, and assistance in development of the chemical test for reactivity of aggregates to Mr. J. L. Gilliland, Dr. K. T. Greene, Mr. E. J. Benton, and Mr. G. B. Lebo, Engineering and Geological Control and Research Division, Bureau of Reclamation, Denver, Colo.

Labor Relations

(Continued from page 73)

of the Regional Office to see that the court's decree is carried out.

If the respondent, or other party, or the agent of the General Counsel does not agree with the court's decree, he can petition the U. S. Supreme Court for a review, which the Supreme Court may or may not do, at its discretion. If the respondent does not comply with the court's decree, in the opinion of the Regional Office, it calls upon the General Counsel of the Board to petition the court to hold him in contempt. Thus, to get action the complainant must in effect convince the Trial Examiner, the Board and the General Counsel of the justice of his charge.

It doesn't appear on the face of the procedure outlined that the labor unions are in any danger of precipitate action to disrupt their organizations. The great advantage appears to be in the complete public airing of all such controversies, and the many opportunities at every stage for the warring parties to reach a peaceable settlement before the controversy reaches the courts.

The foregoing describes only the procedure for that part of the L.-M.R.A. referred to at the start of this page. However, the procedure for hearings on election of bargaining agent, etc., are similar and are designed to fol-

low judicial practice rather than the arbitrary methods pursued by the N.L.R.B. in the past. It requires a petition of at least 30 per cent of employes in an appropriate unit to obtain a collective bargaining election, or to disestablish a union which is already the bargaining agent, but except in the case of an election for a union shop, a mere majority of those voting is sufficient to establish or disestablish the bargaining agent. Where union membership is required of all employees subsequent to acceptance of a contract, the election must be won by a majority of all employees qualified to vote, voting or not.

Accidents Increasing

A CIRCULAR from the Bureau of Mines, "Employment and Injuries in the Mineral Industries, 1946," reports that the safety record of the mineral industries receded last year with the over-all frequency of injuries increasing from 52.58 per million manhours of work in 1945 to 55.43 in 1946.

Incomplete training in safe job methods was listed as the principal factor in the retrogression of mine safety during 1946, and was emphasized by the experience of the portland cement industry. Classification of 10 fatal and 456 non-fatal injury descriptions in cement quarries and plants during the year 1946 shows that 7 of the fatalities and 217 of the non-fatal injuries happened to men with 6 months' or less experience in the occupation at which they were injured.

Over-all injury experience in the quarry industries in 1946 was changed only slightly from 1945 while that of the coal and metal mining occupations rose unfavorably. The rate of occurrence of fatal and non-fatal injuries in quarries was 33.42 in 1946 as against 33.20 in 1945.

In reference to employment the circular stated that the average number of men working daily in the mineral industries increased to 674,400. Yet due to unsettled labor-management relations total worktime dropped to about one and one-third billion manhours in 1946 or 7 per cent below 1945, principally in the metal and coal mines.

Operating activity in each of the quarry industries increased, however, in 1946, and the total man-hours worked in all quarries was 25 per cent greater than in 1945. This was said to be due to the revived demand for quarry products in the construction industry which recovered from its war time slump last year.

Building Cost Spiral

NATIONAL GYPSUM CO. (Buffalo, N. Y.) President Melvin H. Baker believes that costs in the building field may go still higher. His prediction is based on the increase in labor costs, freight rates, fuel and steel prices. All the company's plants are operating on a six day week, but demand is still greater than supply.

FINANCIAL

RECENT DIVIDENDS

Basic Refractories, Inc.	$ .10	Sept. 15
Bessemer Limestone & Cem. Co.	1.00	Sept. 10
Ideal Cement Co.	.40	Sept. 30
Kelley Island Lime & Trans. Co.	.15	Sept. 30
Lone Star Cement Corp.	.87½	Sept. 30
Pennsylvania-Dixie Cem. Corp.	.25	Sept. 15
U. S. Gypsum Co. E	1.00	Oct. 1
U. S. Gypsum Co. Q	.50	Oct. 1
U. S. Gypsum Co. pfd.	1.75	Oct. 1

BLUE DIAMOND CORP., Los Angeles, Calif., issued the following statement of income for the six months period ended June 30, 1947:

	1947	1946
Net sales	$4,441,302	$3,621,023
Costs and exp.	3,457,168	2,824,724
Selling, etc., exp.	299,281	232,019
Operating profit	684,853	564,280
Other income	3,916	32,493
Total income	688,769	596,773
Interest, etc.	9,257	2,501
Fed. income tax	258,000	206,000
Net profit	421,512	388,272
Earned per share	$0.58	$0.53
Number of shares	729,313	729,313

Note: Income for period includes non-recurring income: 1947, $812; 1946, $28,893, of capital assets no longer required in business.
Dividends: Last $0.25 Aug. 20, '47; pd. '46. $0.50.

COLONIAL SAND & STONE CO., INC., New York, N. Y., showed a net income of $466,286 or $0.67 a share for the six months period ended June 30 as compared with an income of $150,719 or $0.19 a share for the same period in 1946.

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., had net sales of $2,595,400 for the three months ended June 30 as against $1,799,248 for the like 1946 quarter. Net sales for the six months period ended June 30, 1947, were $4,927,081 as compared with $3,051,310 for 1946.

UNITED STATES GYPSUM CO., Chicago, Ill., has presented the following income account for the six months ended June 30, 1947:

	1947	1946
*Earned per common share	$4.66	$4.32
Net sales	$50,562,979	$38,054,097
Total income	51,063,824	38,467,505
Costs, deprec., and deplet.	38,601,457	29,545,583
Federal tax prov.	4,745,000	3,474,000
Net income	7,717,367	5,447,922
Preferred dividends	273,777	273,777
Common dividends	1,597,654	1,197,886
Surplus	5,845,936	3,976,259

*After preferred dividend requirements.

PENNSYLVANIA GLASS SAND CORP., Lewistown, Penn., reported a net profit of $680,327 or $1.87 a common share for the six months ended June 30, 1947, as compared with $465,466 or $1.20 a share for the like period in 1946.

PEERLESS CEMENT CORP., Detroit, Mich., showed a net profit of $89,151 for the six months period ended June 30, 1947, as against $211,190 for the like period last year.

NORTH AMERICAN CEMENT CORP., New York, N. Y., showed a net profit of $293,114 for a 12 months period ended June 30, 1947, as against $35,490 for the similar period in 1946. This does not include profit on bonds purchased.

KENTUCKY STONE CO., INC., Louisville, Ky., has presented the following account of income for the years ended April 30, 1947:

	1947	1946
Net sales	$1,364,753	$1,332,338
*Costs and expense	1,056,891	1,029,077
Deprec. and deplet.	129,279	115,847
Operating profit	178,583	187,414
Inc. bond interest		2,723
Income taxes	58,108	102,005
Net income	120,474	82,686
Dividends	46,500	23,250
Surplus for year	73,974	59,436
Prev. earn. surp.	431,680	336,429
Post-war ref. res.		cr 1,465
Bd. retire. res.	cr 55,650	cr 34,350
Inc. tax res.	cr 75,686	
Prem. stk. reacq.	69,300	
Earn. surp., 4-30	567,690	431,680
Earned per share	$16.73	$10.67
No. of shares	7,200	7,750

*After deducting other income.

SOUTH DAKOTA STATE CEMENT PLANT, Rapid City, S. D., showed a profit of $348,096 for the fiscal year ended June 30, 1947, the first $100,000 of which, by a 1945 session law, went to the state general fund. The remainder was allocated to a special road paving fund. The plant set a new production record during the year with the manufacture of 814,485 barrels of cement.

MATERIALS SERVICE CORP., Chicago, Ill., reported a profit of $1,093,993.65 for the year ended December 31, 1946. Net sales for the same period were $14,122,979 as compared with 1945 net sales of $9,515,952.

CALIFORNIA PORTLAND CEMENT CO., Los Angeles, Calif., has reported the following statement of income for the years ended April 30, 1947:

	1947	1946
Oper. profit	$3,399,572	$2,345,974
Deprec. & Depl.	323,396	317,962
Net oper. prof.	3,076,176	2,028,012
Other income	239,759	177,743
Total income	3,315,935	2,205,756
Other deduct.	50,375	15,261
Fed. inc. tax	1,194,489	529,990
Exc. profit tax		697,328
Net income	2,071,071	963,176
Dividends	1,500,000	900,000
Surp. for year	571,071	63,176
Earn. surp., 5—1	4,206,417	4,129,462
Credit	15,381	13,799
Conting. res.	150,000	
Earn. surp., 4—30	4,642,868	4,206,417
Earned per sh.	$41.42	$19.26

Based on 50,000 shares outstanding Apr. 30, 1947.

PACIFIC COAST CEMENT CO., Seattle, Wash., has announced the sale of its preferred and common stock interests in the Pacific Cement Corporation to the Permanente Cement Co., Oakland, Calif. The latter company will offer minority stockholders of the Pacific Coast Corporation an opportunity to buy Permanente shares at approximately the same prices paid for the Pacific Coast company's shares.

WOLVERINE PORTLAND CEMENT CO., Kalamazoo, Mich., was dissolved August 14. The company's assets were purchased by Soper Engineers, S. A., a Panama corporation, for $490,000 which will be distributed to holders of common stock after liabilities and liquidation expenses have been deducted.

ALBERENE STONE CORP. OF VIRGINIA, Schuyler, Va., had a net profit of $13,206 for the six months ended June 30, 1947, as against $13,740 for the same period in 1946. Net sales for the first half of this year were $472,613 as compared with $231,516 for the first half of 1946.

Manufacturers' News

Link-Belt Co., Chicago, Ill., has promoted Ralph W. Rausch from assistant chief engineer in charge of estimate-engineering at the Pershing Road plant, to chief engineer, succeeding C. S. Huntington, who has retired because of ill health. H. Walter Regensburger, assistant to the vice-president in charge of engineering, Chicago

R. W. Rausch

E. P. Berg

office has been appointed divisional engineer in charge of estimate-engineering at the plant. Eugene P. Berg, who has served as assistant to the president since the recent death of E. L. Berry, vice-president in charge of production, has been appointed general superintendent, and Joseph C. Spence, general superintendent, has been appointed assistant to Harold L. Hoefman, vice-president in charge of manufacturing.

The E. P. Barber Co., Bloomington, Calif., manufacturer of the Bartile concrete tile roofing machine, has appointed L. E. Harrington as national sales director.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the election of Harold S. Falk, president of The Falk Corp., as a member of the board of directors, and the appointment of Frank A. Young as manager of the Duluth office.

Ford Motor Co., Dearborn, Mich., has announced the appointment of I. L. Pierce as director of the service department; Laird A. Hanson as supervisor of parts and service merchandising, replacing M. D. Dean who has been appointed manager of the Wichita truck branch; and O. Fred Yando as assistant regional manager of the Central region.

LaClede-Christy Clay Products Co., St. Louis, Mo., announces the appointment of Julius A. Kayser as assistant to the president, Donald N. Watkins. The company also announces the purchase of the Osceola Silica & Firebrick Co., Osceola Mills, Penn., and the appointment of Albert B. Agnew, formerly with Harbison-Walker Refractories Co., as general manager of the Osceola company.

St. Regis Paper Co., New York, N. Y., announces plans for the construction of a $6,000,000 kraft paper mill and multiwall bag plant at Tacoma, Wash.

Fairbanks, Morse & Co., Chicago, Ill., has appointed L. A. Weom as manager of the pump division.

General Motors Corp., Detroit, Mich., has announced the introduction of an improved line of light and medium duty FC model trucks with a new and bigger cab, ranging from 4600 to 18,000 lb. gross vehicle weight.

International Paper Co., New York, N. Y., has opened a branch sales office in Los Angeles, Calif., with Frank N. Gladden as district sales manager. The office is located at 607 South Hill Street.

Link-Belt Co., Chicago, Ill., has appointed Albert Musschoot as assistant to the chief engineer, with headquarters in Chicago. Mr. Musschoot, a member of the general engineering staff at Philadelphia, will be directly responsible to Richard F. Bergmann, vice-president and chief engineer.

Leeds & Northrup Co., Philadelphia, Penn., announces that L. R. Garretson, advertising manager since 1925, has retired due to ill health. He will be succeeded by Kenneth W. Conners, who has been a member of the advertising division since 1934.

Cataphote Corp., Cement Products Division, Toledo, Ohio, has announced the appointment of James F. Roose to the sales staff for the sale and marketing of Darex AEA, air entraining agent, and the addition of the territories of Tennessee, Alabama, Mississippi and Florida.

The Buda Co., Harvey, Ill., has appointed Harry G. Campbell as sales manager of the DieseLight division which handles sales and manufacture of Diesel electric and gasoline electric generator sets.

New Holland Mfg. Co., Mountville, Penn., has appointed Franklin M. McCorkel as district manager for Ohio, Kentucky, Michigan, with the exception of the Upper Peninsula, West Virginia, and that part of Tennessee east of the Tennessee river. He will make his headquarters in Columbus, Ohio. A veteran of World War II, Mr. McCorkel served as a 1st lieutenant in the 3rd Army. He was a student at Syracuse University and Franklin and Marshall College. Mr. McCorkel will contact New Holland distributors and dealers of industrial equipment and will be the general company representative in his area.

Franklin M. McCorkel

American Hoist & Derrick Co., St. Paul, Minn., announces that Clifford N. (Pete) Peterson has been appointed direct factory representative covering the Pacific Coast area, with headquarters at San Francisco.

American Brake Shoe Co., New York, N. Y., has appointed Selby F. Greer as general sales manager for the Kellogg Division, Rochester, N. Y. He will succeed H. O. Holland, vice-president and former general sales manager, who will assume new duties.

National Supply Co., Pittsburgh, Penn., is inaugurating a personnel training program for all its manufacturing plants, sales and engineering departments and company stores. Dr. B. E. Warden, former dean of students and director of student personnel at Carnegie Institute of Technology, has been appointed educational director, with headquarters in Pittsburgh. This announcement was made by A. E. Walker, president of the company.

Hammond Bag & Paper Co., Wellsburg, W. Va., announces the leasing of a plant at Pine Bluff, Ark., for the manufacture of Multi-Wall paper bags, with Allen E. Weaver as production manager. The plants at Wellsburg, W. Va., are also being expanded.

John A. Roebling's Sons Co., Trenton, N. J., has announced the appointment of F. G. Hoyt as general manager of the woven wire fabrics division. He will be assisted by J. Fennell Berger as assistant manager of sales, and F. Clifford Peet as superintendent of production.

Chase Bag Co., Chicago, Ill., celebrating its 100th anniversary this year, has completed the construction of three new plants at Minneapolis, Minn.; Crossett, Ark., and St. Louis, Mo. An addition is also being made to the plant at Reidsville, N. C.

Twin Disc Clutch Co., Racine, Wis., has announced the appointment of Roger G. DeLong as manager and W. B. Gibson as sales manager of the hydraulic division in Rockford, Ill.

Goodyear Tire & Rubber Co., Akron, Ohio, announces the appointment of Claude E. Davis as field engineer in the Midwest for the mechanical goods division, with headquarters at St. Louis, Mo.

R. G. LeTourneau, Inc., Peoria, Ill., has announced the promotion of Roy E. McCluskey, assistant treasurer, to the position of vice-president in charge of sales. Oscar W. Nelson, vice-president and general manager of the Peoría division, has resigned since his assignment of reconversion and reorganization has been completed. Robert F. Nelson, vice-president and assistant to the president, has also resigned but is continuing his association with the company as a member of the board of directors, maintaining his executive offices in New York City.

The Timken Roller Bearing Co., Canton, Ohio, has announced the retirement of Harry Y. McCool, Sr., superintendent of maintenance of the steel and tube division, after more than 31 years of service with the company.

Gar Wood Industries, Inc., Wayne, Mich., has named E. D. Wallace as sales manager of the Buckeye Traction Ditcher division at Findlay, Ohio. W. C. Petersen has been appointed service manager of the division. W. E. Dawson has been appointed district manager, general line, for the West Coast territory, and W. R. Steenrod has been named district manager, general line, in Milwaukee, Wis.

Mobilift Corp., Portland, Ore., (previously known as the General Equipment Co.) has announced the opening of an office in San Francisco, Calif., with R. M. Lewis as manager. Mr. Lewis formerly sold Mobilift trucks for the Star Machinery Co., Seattle, Wash. Announcement has also been made that T. H. Skeel is replacing E. J. Sell as manager of the Atlanta, Ga., office.

Nordberg Mfg. Co., Milwaukee, Wis., has appointed the following division managers as vice-presidents: Roland W. Bayerlein, heavy machinery division; H. H. Talboys, railway equipment division; D. A. Cheyette, crusher division; and R. R. Shafter, process machinery division. Mr. Bayerlein has been associated with the company since 1919, starting as a co-op engineering student of Marquette University. After receiving his degree in mechanical engineering in 1924, he served as sales engineer. In 1933 he became assistant to the vice-president in charge of sales and engineering of the heavy machinery division and two years later was appointed manager of that division. Mr. Talboys joined the company in 1923 as manager of the railway equipment division. He was formerly associated with the Lake Superior Loading Co. as sales manager. Mr. Cheyette has a background of 30 years' experience in crushing, grinding, cement and mining machinery design and application. He was formerly associated with Kennedy-Van Saun Mfg. & Eng. Corp. and the Traylor Eng. & Mfg. Co. Mr. Cheyette joined the Nordberg Mfg. Co. in 1937 and became sales manager of the crusher division and general manager in 1944. Mr. Shafter served a year in training at Allis-Chalmers Mfg. Co. after which he joined Traylor Eng. & Mfg. Co., serving this company for over 33 years. He supervised the design and construction of many crushed stone, gravel, cement, clay, lime, alumina, mining, milling and smelting plants. Mr. Shafter joined the Nordberg Mfg. Co. in 1944 as manager of the process machinery division.

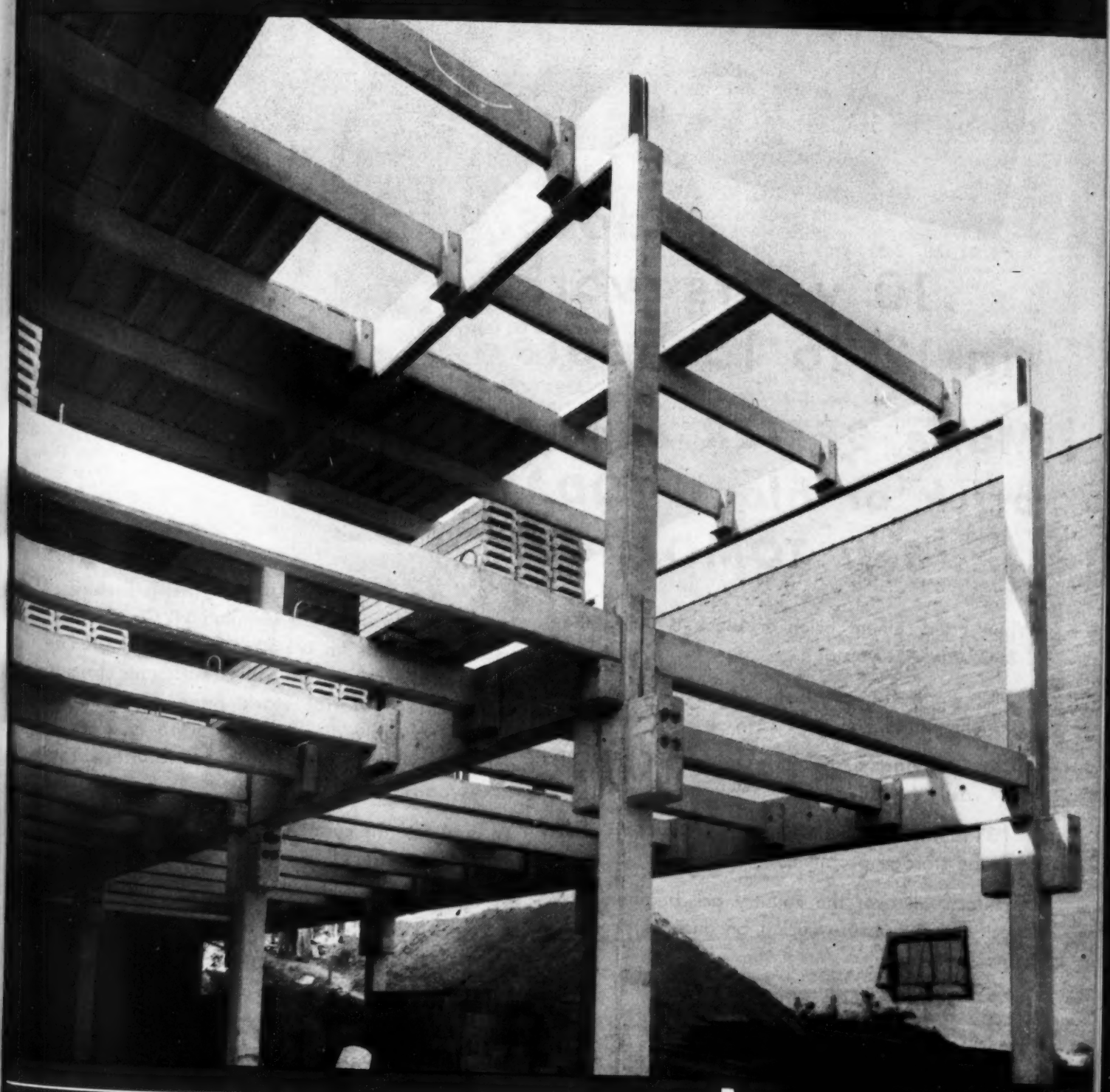
D. A. Cheyette

R. R. Shafter

H. K. Porter Co., Inc., Pittsburgh, Penn., has promoted Harold A. Hintz to Pacific Coast sales manager with headquarters in Los Angeles. J. F. Morley has been made district sales engineer with offices in San Francisco, Calif.

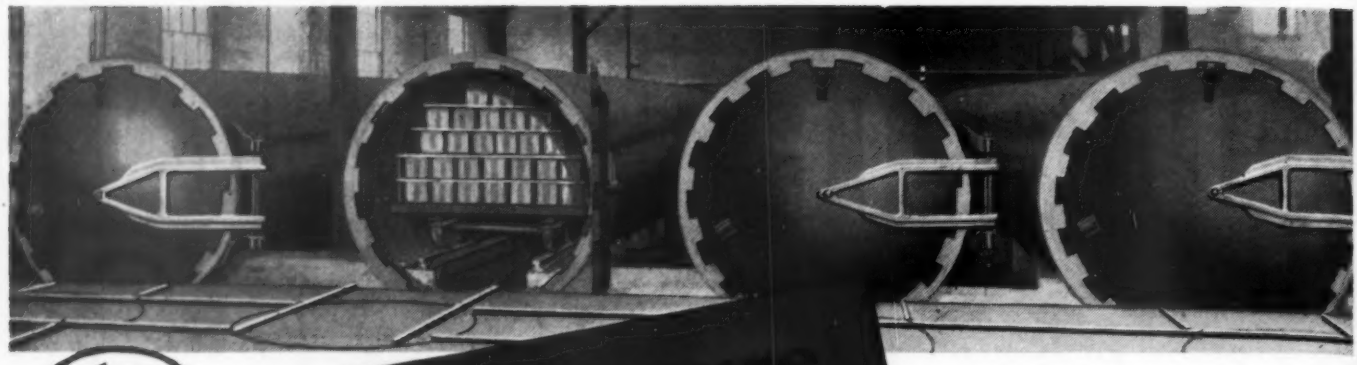
CONCRETE PRODUCTS

CONCRETE UNITS · READY-MIXED



Good example of what can be done with precast concrete in the construction of large structures

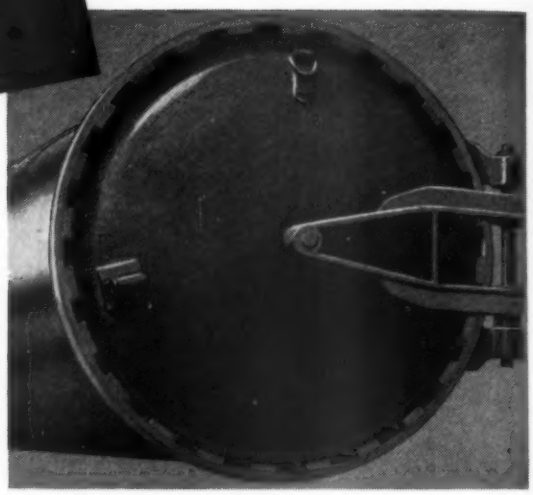
A SECTION OF ROCK PRODUCTS



Concrete blocks in cylinder

J&C High Pressure CURING...

does 10 years work in 12 to 15 hours



J & C quick opening door

Make BETTER cement brick or block TODAY . . . Sell TOMORROW!

78-foot kiln on flat cars for shipment

When your cement brick or block is cured the **J & C way** . . . you get:

1 . . . **a better product** . . . with all shrinkage eliminated.

2 . . . **savings** . . . through the elimination of costly handling.

3 . . . **immediate delivery of product** . . . with no storage problem.

Architects all over the country are beginning to specify high pressure curing because of **product superiority alone.**

Manufacturers who have installed J & C equipment **use less cement for a better product,** and eliminate **handling costs** and capital outlay for **storage space and material stock piles.** The over-all savings normally amount to from 15 to 25% as compared with costs for the **old-fashioned time-and-weather curing.**

To duplicate the curing effect that **J & C achieves in 12 to 15 hours,** would require **ten years under ordinary methods.**

For complete details concerning J & C High Pressure Curing equipment... **write us today**... at Saginaw.

A PRODUCT OF J&C

JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

INDUSTRY NEWS

CHRISTENSEN CONCRETE PRODUCTS Co., Grand Island, Neb., has started the production of vibrated concrete block at the rate of 3500 per day. Thomas E. and Earl L. Christensen own the new company.

WATERBURY READY MIXED CONCRETE Co., Waterbury, Conn., is producing cinder block at the rate of 5000 per day. Marketed under the trade name of "Redicrete," the blocks are smooth-surfaced. J. Francis Smith is president of the company, and Joseph DeLauretis is plant manager.

ROCHESTER READY MIX CONCRETE Co., Rochester, Minn., has been purchased by Julius O. Dalsbo and Ray J. Arend, and will continue operations under the same name.

GEORGE KAUTZMANN has started the production of concrete block in Beach, N. D., at the rate of 800 per day, part of which will be used in the construction of buildings to house the new business.

BUTLER CONSTRUCTION Co., Grand Forks, N. D., has placed a ready-mix concrete plant in operation with Cliff Yagla as manager. All of the mixing is being done in trucks.

ALLISON CONCRETE PRODUCTS, Stanberry, Mo., has started the manufacture of concrete block with a capacity of 1000 block per day, Herbert Allison, owner, has announced.

PLYMOUTH BLOCK Co., Plymouth, Ohio, is producing concrete block on a Multiplex block machine at the rate of 800 per day. Henry Van Loo and Don Roe own and operate the industry.

STANLEY BOCCHINE has constructed a concrete block plant at Ogdensburg, N. Y. Capacity of present equipment is 1600 to 2000 block per 8 hour day.

DELL PALMER, Pratt, Kan., is manufacturing interlocking concrete block at a 700 per day capacity. The new business is known as the Mortarless Cement Block Co.

WILLIAM HYTINEN has opened a $10,000 plant at Nehalem, Ore., for the production of ready-mixed concrete. Hytinen also intends to handle prefabricated houses.

B. F. PEARCE AND SONS have begun the manufacture of concrete block at Wharton, N. J.

BEULAH CEMENT BLOCK Co., Beulah, N. D., has been organized by John Brazzell, Robert Coons, and Bernie Halvorson, and is producing concrete block at the rate of 1000 per day.

BAKER-SHINDLER BUILDERS SUPPLY Co., Defiance, Ohio, has opened a central-mix concrete plant, using a Smith mixer, Columbus Conveyor Co. elevators, and Blaw Knox bins.

PARLINSON BROS., manufacturers of concrete building block and drain tile, Fonda, Iowa, have added a mine track and carts to their equipment.

WESTERN CONCRETE PRODUCTS Co., Lincoln, Neb., has started the construction of a new factory at Hastings for the manufacture of ready-mixed concrete and concrete block. Ultimate capacity of the plant will be 500 block per hour. Martin R. Sherwood will be manager of the Hastings branch.

R. C. JOHANNES of the Georgia Concrete Builders, Inc., has started construction of a concrete block plant in Acworth, Georgia, which will operate as the Acworth Masonry Co.

UNIVERSAL CONCRETE PIPE Co., Columbus, Ohio, has started the production of concrete block, sewer and culvert pipe at its Norristown, Penn., plant, H. X. Eschenbrenner, company president has announced. Harold J. Leuliette is manager of the Norristown plant.

WALLA WALLA MORTARLESS BLOCK Co., Walla Walla, Wash., has doubled its output with the installation of a new block machine, and is now manufacturing pumice pipe and fence posts in addition to concrete block. Ted DeMotts is plant manager.

PRE-CURE CONCRETE PRODUCTS Co., Newport, Del., has filed articles of incorporation at Dover, Del., listing capital of 250 shares of no par value. The company will manufacture concrete building blocks.

MODERN CONCRETE PRODUCTS Co., Whitewater, Wis., with a capital of 100 shares, no par value, has been incorporated by Jacquelyn Joosten, Earl F. Wolf, and Robert C. Bulkley.

HUDSONVILLE CONCRETE Co., Hudsonville, Ill., has been incorporated by Elizabeth R. Newlin and Maxine Moorehead.

RAYMOND O. MOORE, WILLIAM J. WILLS, MIRIAM J. WILLS AND KATHLEEN S. MOORE have petitioned for a charter to organize the Moore-Wills Concrete Co. at Macon, Ga., for the manufacture of ready-mixed concrete. Capital stock was listed as $17,500, with shares of $100 each. The petitioners asked the right to increase capital to $150,000 by a vote of stockholders. The charter is requested for a period of 35 years.

UNIVERSAL CONCRETE PIPE Co., Columbus, Ohio, has started construction of concrete block at its Norristown, Penn., plant, Harold J. Leuliette, Norristown plant manager, has announced. The plant had been specializing only in the construction of sewer and culvert pipe formerly.

GEORGE W. JACKSON AND CHARLES A. COX, both veterans of World War II, have purchased the Peterson Block Co., Columbia Heights, Minn., and will operate the firm under the name of the Jackson-Cox Co.

POLYOCK BROS. have started the manufacture of concrete block at Beloit, Wis.

R. E. MOSER has purchased the tile and concrete business of Ernst Haller, Highland, Ill.

ADAMS CONCRETE PRODUCTS Co., Fuquay-Varina, N. C., is the name of a new company owned and operated by T. F. Adams, James D. Adams, and Roderick D. Adams. Capacity of the plant is 2000 concrete block per day. Plans are being made to manufacture other concrete products.

MORTARLESS BLOCKS, INC., Bremerton, Wash., is the name of a new concrete block plant being constructed by Lambert Schuyler and W. Kelley Price, both of Bainbridge Island.

BEAVER READY MIX CONCRETE Co., Oak Grove, Wis., has been organized to deal in ready mixed concrete and other building products and supplies. Authorized capital is 1000 shares, par value $100. Incorporators are Albert Kaepernick, Jr., LaVern Kohn and Reuben Kuntz. Attorneys are Lueck, Skupniewitz and Lueck, Beaver Dam.

J. F. JACOBS & SON MFG. Co., Sacramento, Calif., has opened a new plant for the production of pumice concrete brick, block and tile.

HANSON, WOOD & HOEL INDUSTRIES, INC., Tallahassee, Fla., has started a concrete products plant. They have installed a new Lith-I-Bar block machine and will make a Super-Rock block. T. W. Wood is president and D. L. Hanson is secretary and general manager.

HAROLD LAWSON has opened a ready mixed concrete plant in Rosalia, Wash., which will be operated by Kenneth Hart.

HURON CEMENT PRODUCTS Co., Huron, Ohio, recently reorganized the company, with George Mattey taking over the stock held by Lyman Griggs, also the managership of the firm. Rolland David was chosen as president; Tony Gioffre, first vice-president; Joe Gioffre, second vice-president; Aksel Jensen, Jr., secretary; and George Mattey, treasurer. Capacity of the plant will be increased to 2000 block per day.

LOUIS KALIMAGE AND NICHOLAS SPALLONE are constructing a concrete block and brick plant in Margaretville, N. Y., that will have a capacity of 1000 block per day.

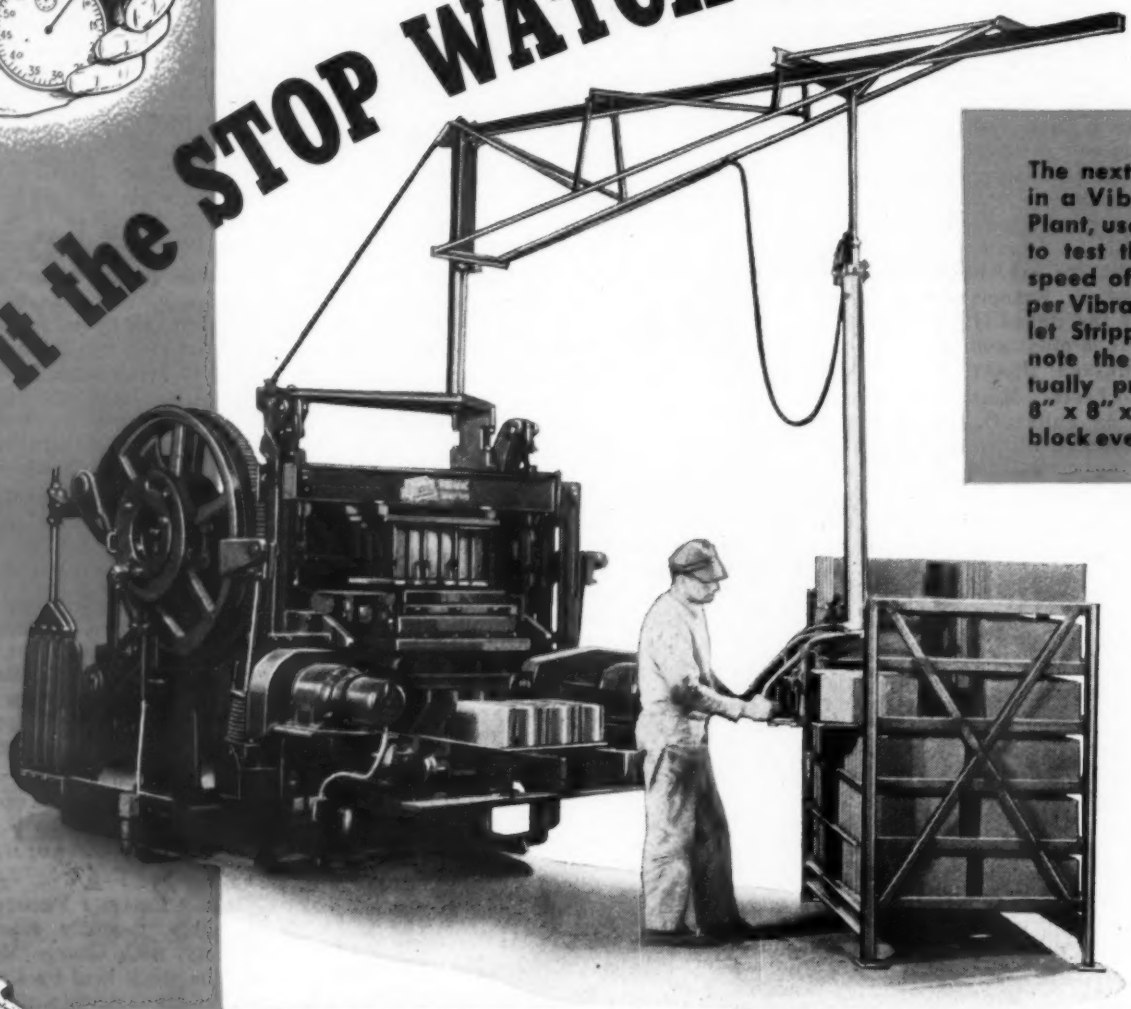
GOLDENDALE CEMENT PRODUCTS Co., Goldendale, Wash., is building a pumice concrete block plant that will produce 1500 block per day. C. M. Weiss is the owner.

CHARLES E. KEISLING, Albuquerque, N. M., has been authorized to build a plant to manufacture concrete laundry trays and similar items. Capital is $1700.

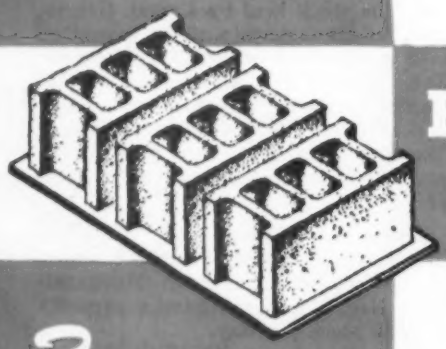
H. AND B. BUILDING BLOCK & SUPPLY Co., Findlay, Ohio, taken over recently by the Hoppenberg Machine Co., has been expanded and can now manufacture 3500 concrete brick per day. Karl Moore, a veteran, is manager of the plant.

BEE FARM CONCRETE PRODUCTS Co., Carbondale, Ill., has started producing concrete block. William Cox and Frank Silvania are the owners.

Give it the STOP WATCH TEST!



The next time you in a Vibrapac B Plant, use a stop w to test the produc speed of a Besser per Vibrapac Plain let Stripper. You note the machine tually produces f 8" x 8" x 16" conc block every 18 secon



BESSER SUPER VIBRAPACS *are Faster . . . More Profitable*

3 at a time!

Three 8" block are produced at a time; four 6" block; six 4" block; 32 solid brick; other sizes in equivalent multiples. Only one set of Plain Pallets is required for *all* sizes of units. All Vibrapacs since 1945 built to make all modular units. Older Vibrapacs easily changed to modular.

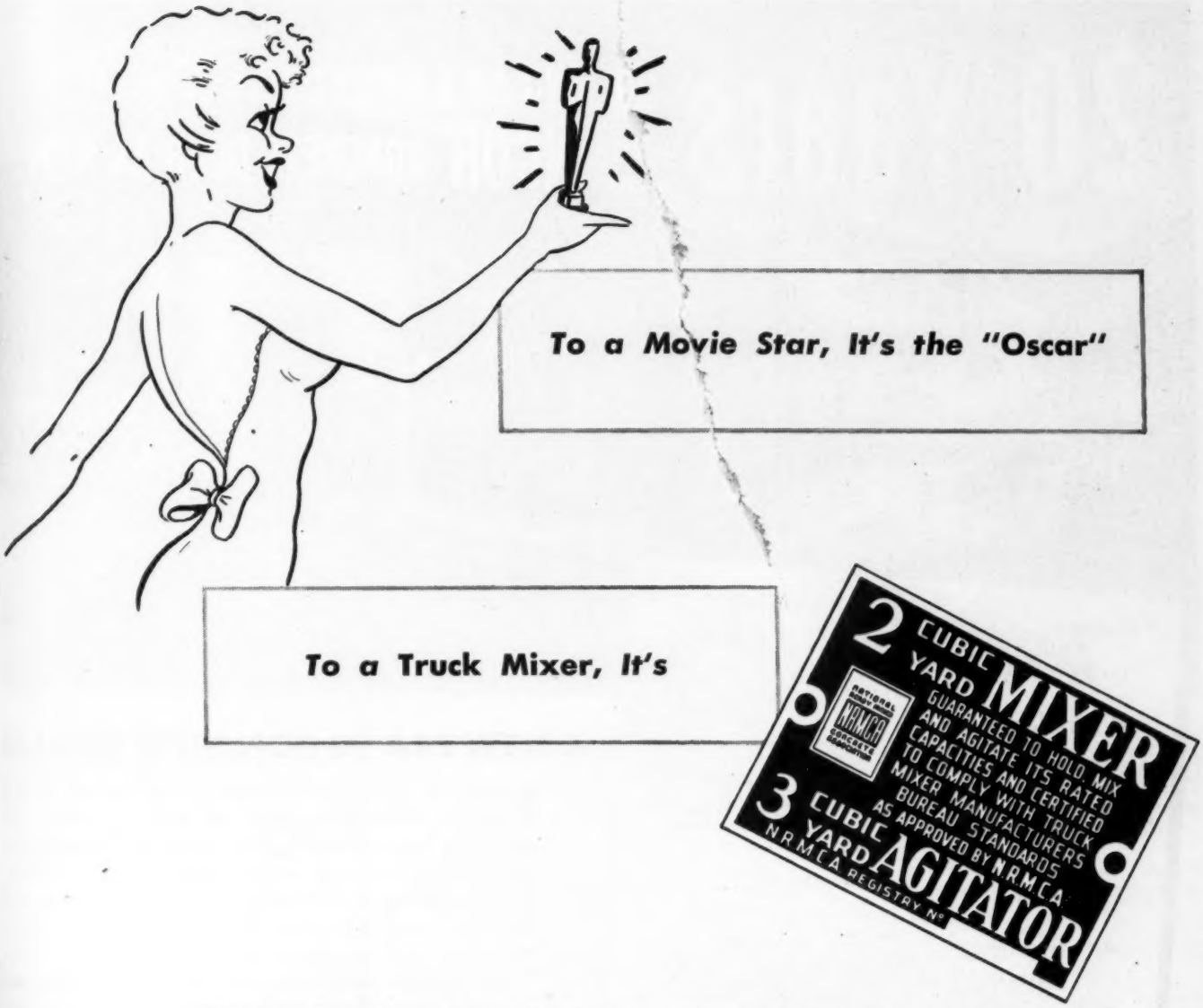
The profits of your concrete block plant depend largely on your daily output of block . . . the total number of block you can actually produce every 8-hour day with the smallest number of men. The Besser Vibrapac is FULLY AUTOMATIC with power off-bearing hoist. No machine operator required! No lost motions! No time wasted! Pallets are fed automatically and the mixed aggregates are fed by gravity. Three 8" x 8" x 16" block with Fully Pressed Top are produced every 18 seconds. That's real block production. And the machine easily maintains this high rate of production over long periods of time. A Besser Engineer will gladly explain how a Super Vibrapac can do the same for YOU, in YOUR plant. Write today.

BESSER MANUFACTURING COMPANY • ALPENA, MICH. U. S. A.

Complete Equipment for Concrete Products Plants

THE SAVING IN PALLET C WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER

BESSER PLAIN PALLET VIBRAPACS



To a motion picture star, the Academy Award "Oscar" represents the pinnacle of achievement.

In the field of ready-mix concrete, the award of the Truck Mixer Bureau's rating plate is equally indicative of achievement. For the award of this plate means that the mixer has successfully met the standards set up by the Bureau for your protection. Drum capacity is *exactly* that stated on the plate. It's your protection against "outlaw" sizes . . . your guarantee of accuracy.

Remember, when you see the Bureau rating plate on a truck mixer, you can buy with confidence . . . operate with accuracy.

Truck Mixer Manufacturers Bureau

Affiliated with The National Ready Mixed Concrete Association

BLAW-KNOX DIVISION
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CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.

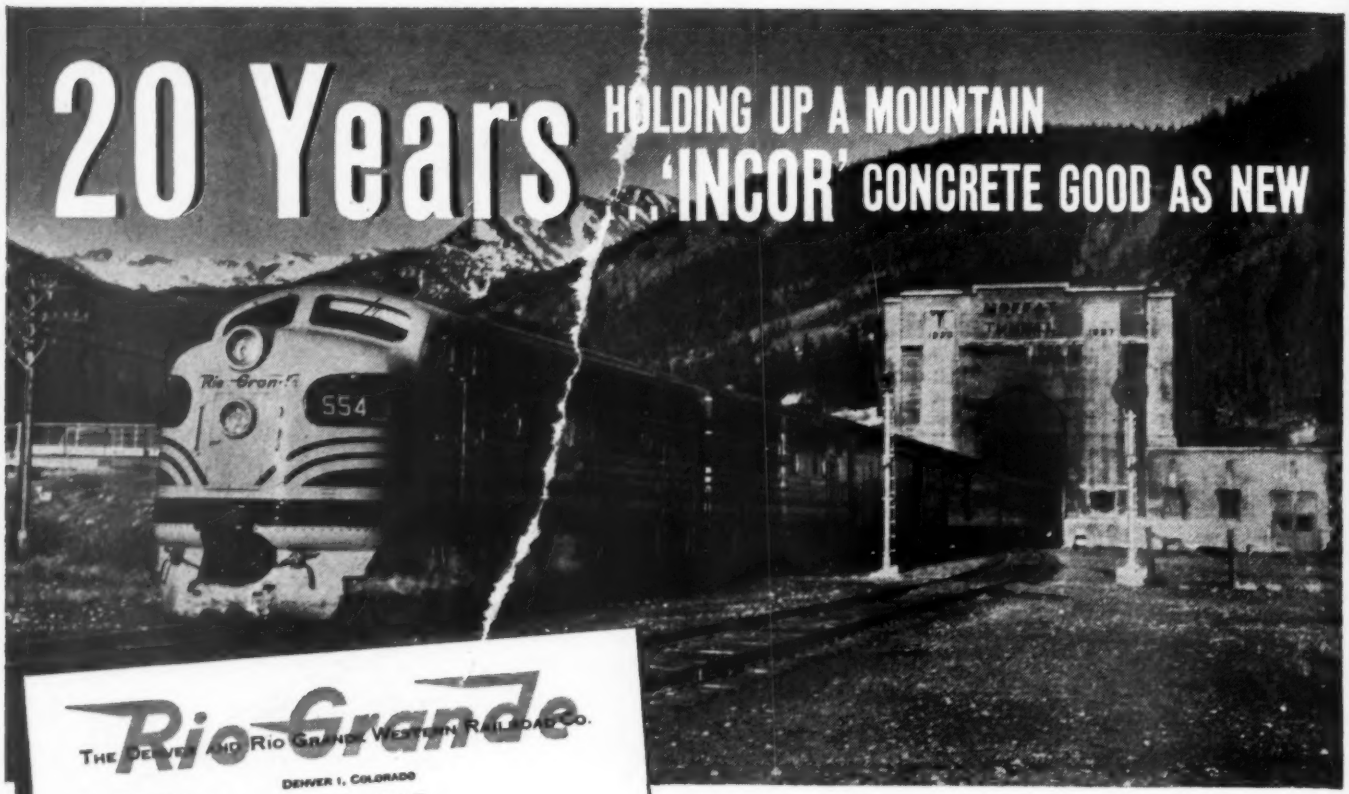
RANSOME MACHINERY COMPANY
Dunellen, N. J.

CHAIN BELT COMPANY
Milwaukee, Wis.

THE JAEGER MACHINE COMPANY
Columbus, Ohio

THE T. L. SMITH COMPANY
Milwaukee, Wis.

20 Years HOLDING UP A MOUNTAIN 'INCOR' CONCRETE GOOD AS NEW



THE DENVER AND RIO GRANDE WESTERN RAILROAD CO.
DENVER 1, COLORADO

A. E. PERLMAN
CHIEF ENGINEER

June 28, 1947

Dear Mr Hummel

I have on my desk an inspection report on the concrete sections in the Moffat Tunnel from Mr Glen Turner, our Division Engineer on the Moffat Division Mr Turner reports as follows

"Made a complete inspection of the Incor cement sections of the Moffat Tunnel and find these sections, which were placed in the Tunnel twenty years ago, to be in excellent condition. Despite the tremendous pressures to which these sections are subject, there is absolutely no evidence of structural failure or disintegration The concrete appeared very hard and rang true when struck with a pick "

I know you will be happy to have this information, and I can assure you we are very well pleased with the performance of your Incor cement in the Moffat Tunnel

Very truly yours,

A. E. Perlman

Mr R A Hummel, President
Lone Star Cement Corporation
342 Madison Avenue
New York, N Y

Letter, above, tells of outstanding 'Incor' performance in Moffat Tunnel. Right, Glen Turner, Division Engineer, Denver & Rio Grande, examining 20-year-old 'Incor' concrete—holding up a mountain, blocking off ground waters—a generation of service and not a dollar for maintenance.

A NEW ERA IN CONCRETE BEGAN

TWENTY years ago, the Moffat Tunnel was being driven six miles through the Rockies. Masses of soft rock and earth, sagging under the Mountain's weight — pressures up to 10 tons per sq. ft. — had to be held in check. Ordinary concrete hardened too slowly . . . concrete that gained strength, *fast and sure,* was needed and needed badly.

Years before, anticipating the needs of construction progress, Lone Star Cement technicians began rearranging the chemical structure of Portland cement. And so it was that 'Incor', America's FIRST high early strength Portland cement, was available — and on time. 'Incor' concrete withstood the almost fabulous pressures . . . held up the mountain . . . has been holding it up ever since . . . not a dollar for maintenance.

Just how well has 'Incor' performed through the years? A 20-year Condition Survey has just been completed. Chief Engineer Perlman's letter — "despite the tremendous pressures, there is absolutely no evidence of structural failure"—keynotes a report of *outstanding 'Incor' performance across the entire range of construction.*

A new era in concrete began 20 years ago at Moffat Tunnel. Dependable 'Incor'* high early strength that held up a mountain then, holds down construction costs now. Today, more than ever, this is the 'INCOR' ERA.

*Reg. U.S. Pat. Off.

LONE STAR CEMENT CORPORATION

Offices: ALBANY • BETHLEHEM, PA. • BIRMINGHAM • BOSTON • CHICAGO • DALLAS HOUSTON • INDIANAPOLIS • JACKSON, MISS. • KANSAS CITY, MO. • NEW ORLEANS NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25,500,000 BARRELS ANNUAL CAPACITY

From the MOVIES to Lightweight Aggregates

AleXitE Engineering Division of Alexander Film Co., Colorado Springs, Colo., develops two lightweight aggregates for masonry and plaster and manufactures concrete brick

By W. B. LENHART

Miss Colorado lends an attractive background for PerAleX insulating concrete aggregate and PerAleX insulating plaster aggregate

IN this swiftly moving age, it is not too unusual to find companies branching out into fields which hold little relation to the basic industry of the parent company. One of these interesting enterprises is the AleXitE Engineering Division of the Alexander Film Co., Colorado Springs, Colo., formerly known as the AleXitE Engineering Co. This concern started at the beginning of World War II to mine and process vermiculite, which has been marketed under its trade name of AleXitE.

About three years ago, this division started investigating the possibilities of processing perlite and as a result acquired extensive holdings of that mineral near Superior, Ariz. A successful method of heat exfoliation of perlite has been worked out, and a rotary kiln for treating the crude perlite was installed in its plant at Colorado Springs. This expanded volcanic rock is being sold under the trade name of PerAleX.

Processing Vermiculite and Perlite into Aggregate

The engineering department of the company is preparing plans to enable potential manufacturers of expanded perlite at distant points to install expansion furnaces to take advantage of the lower freight rates on the heavier crude material. Expanded perlite occupies so much volume that only about 26 tons can be shipped in an ordinary box car with the result that freight must be paid on the 30-ton minimum basis. By shipping the crude perlite, a lower (per ton) freight rate is possible with a full capacity car shipment as well. The AleXitE Engineering Division will supply the engineering "know-how" on expansion and end products, and sell the crude but properly sized perlite at a nominal per ton selling price. Freight rates are said to be such that it will be possible to ship the crude material into the deep South and into the eastern states.

Thus the AleXitE Engineering Division is now producing two lightweight aggregates; vermiculite and perlite. The former is a micaceous mineral containing water of crystallization which expands and increases its volume from eight to ten times when heated. The crude material is secured from the company's mines in Colorado and Wyoming. The crude vermiculite, after classifying, is expanded in a vertical furnace with the raw material being fed to the top of the furnace. Baffles inside the furnace permit the ore to flow downward with the heat passing upwards, through and around the mass somewhat like the action of a Scott furnace. The furnace in use at Colorado Springs was company designed. Natural gas is used for heating. The expanded material after passing through the exfoliation furnace is elevated to steel sacking bins.

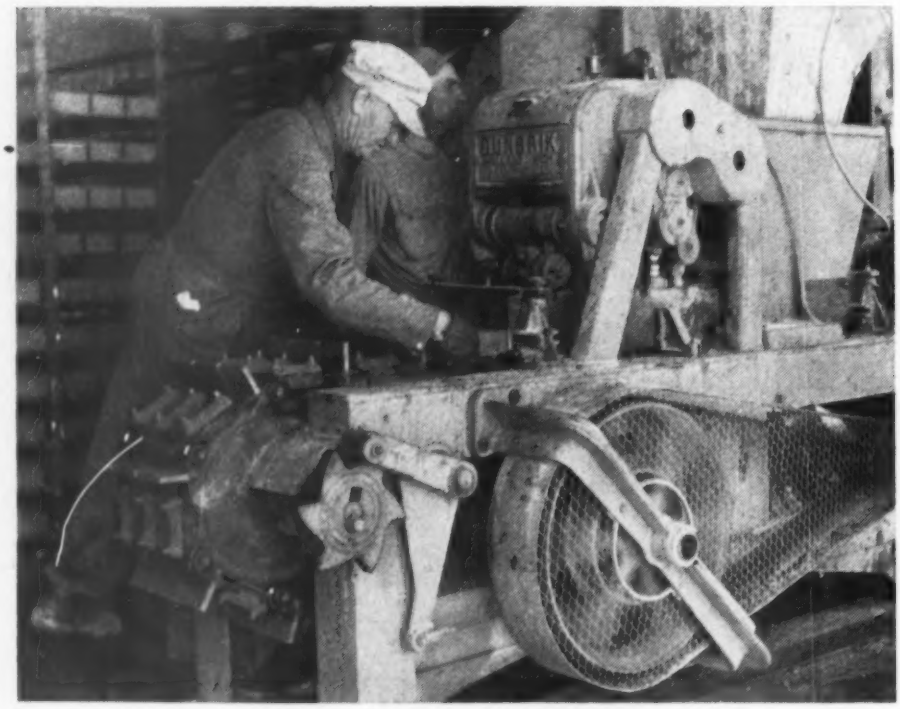
The company has just purchased a $60,000 Cedarapids portable crushing and screening plant. This plant has a capacity of about one car load per hour of classified perlite ore. This crushing and sizing plant will deliver properly sized material ready for its Colorado Springs plant as well as for others which will process materials under license from the AleXitE Engineering Division. At present the Cedarapids unit is installed at the Colorado Springs operation but should soon be moved to the perlite deposits in Colorado.

Perlite Concrete Brick

In addition to the company's activity in processing lightweight aggregates for wide distribution, the company also has entered into the concrete masonry industry, having recently completed the installation of a Dunbrik machine for the manufacture of PerAleX concrete bricks. The company is producing the commonly used single brick as well as doubles and a triple-size brick. These brick (singles) weigh about one-third as much as a sand and gravel brick, and sell locally for $50 per thousand or $52 loaded on railroad cars.

This very attractive brick is made with a 5 to 1 mix which gives it sufficient strength to meet all local code requirements. The PerAleX brick has nearly ten times the heat insulation value of the sand bricks, as well as having very low water absorption properties and is nailable without splitting, it is claimed. The company sells the expanded PerAleX in bags for 35¢ per cu. ft., f.o.b. Colorado Springs, with deposit and refund arrangement on the bags. The extra price paid for the PerAleX from the standpoint of insulation would be returned to the builder in a few years in fuel economy.

At Colorado Springs a 3- x 40-ft. natural gas fired rotary kiln lined with fire brick has been installed. The



Making lightweight PerAleX concrete brick

expanded PerAleX passes through a suitable dust collecting system that removes the extremely fine material from the aggregate. This fine material which is snow white and very light is the base for AleXitE Surfaseal, which is delivered in bags to be mixed with water and used as a brush coat on waterproof stucco and an inside and outside waterproofer for all masonry. Near the rotary kiln has been installed the Dunbrik machine. Suitable steam kilns for proper curing of the finished bricks are now being built. a Mo-tow lift truck handles the brick.

PerAleX is finding an extended use for plastering purposes in this area, replacing sand. One contractor reported that his crew of plasterers put on 30 sq. yd. of sand-gypsum plaster per 8 hours, but with PerAleX-gypsum plaster, 43 sq. yd. were placed in 8 hours, with the workers preferring to use the lighter material. This time saving of more than 43 per cent more than pays for the extra cost of PerAleX aggregate over sand. After PerAleX plaster has set, it is said to be tough and more resistant to cracking than plaster made with sand, as well as having an insulation and fireproofing value about 3 times sand plaster.

The following figures relate to the density and Thermal Conductivity (K factor) of perlite:

Volume Mix Perlite-Cement	Density lbs. per cu. ft.	Thermal Conductivity
8-1	25.4	0.643
7-1	25.4	0.657
6-1	27.1	0.693
5-1	29.2	0.726
Minus 3, plus 10 expanded perlite	8.67*	0.49
Minus 10, plus 30 expanded perlite	7.34*	0.393
Ordinary sand (for comparison)		10.0

*Loose fill

Perlite concrete showed strengths as follows when used with the indicated mix:

3-1	1780 p.s.i.
5-1	918 p.s.i.
7-1	560 p.s.i.

PerAleX concrete slabs made with a 5 to 1 mix, 12- x 12- x 3-in., were punch tested, showing an average load of 2640 p.s.i. when the blocks were placed in a compression machine and pressure slowly applied using a 1-in. square punch.

The officers of the AleXitE Engineering Division of Alexander Film Co. are: J. Don Alexander, president; D. M. Alexander, vice-president; E. F. Dillon, sales manager; R. G. Hemingway, assistant sales manager; and Ray Ebeling, plant superintendent.

The Alexander Film Co., is the largest producer-distributor of short-length theatre screen advertising in the world. Its studio in Colorado Springs, Colo., includes one of the largest soundproof stages for sound motion pictures east of Hollywood, and is constructed of PerAleX bricks and roofed with PerAleX-Flexicore slabs. The company's assets are in excess of $2,500,000. When we asked why a motion picture company became interested in processing vermiculite and perlite we learned that it is the policy of J. Don Alexander, president

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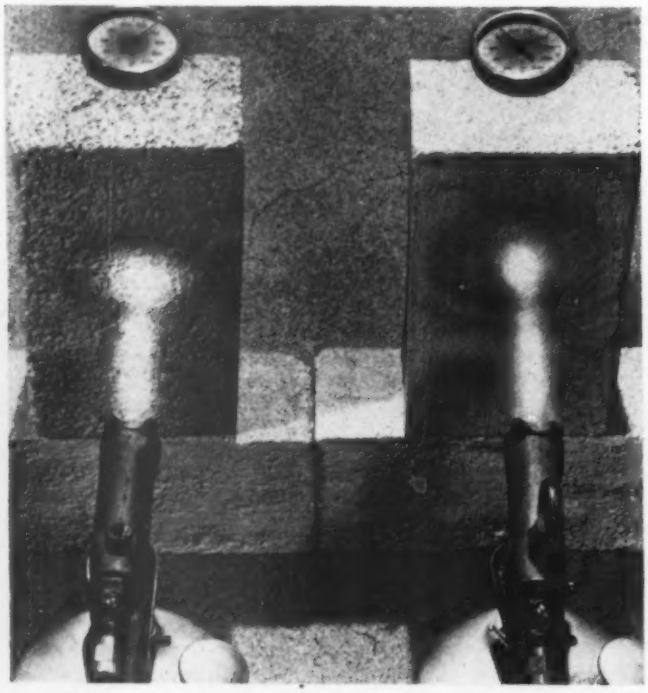
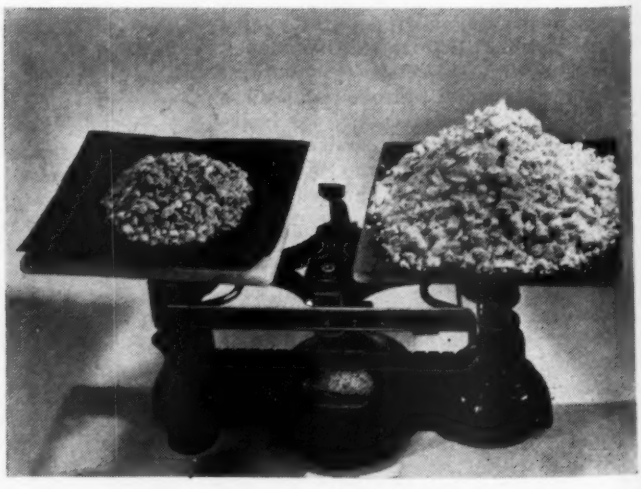


Left: Subjecting sand concrete brick and PerAleX concrete brick to heat tests with blow torches. The lightweight brick temperature only rose 4 deg. in 45 minutes but the sand brick jumped 62 deg. in this heat test

Below: Perlite ore, left, expands to five times its volume in the rotary kiln to make PerAleX



Four Years' Experience Delivering Air-Entrained Concrete In Non-Agitating Equipment

J. A. Nicholson, Toledo, Ohio, has placed 150,000 cu. yd. of central-mixed air-entrained concrete, making deliveries as far as 15 miles from plant

By BROR NORDBERG

Kenneth L. Drew, plant superintendent, left, with J. A. Nicholson

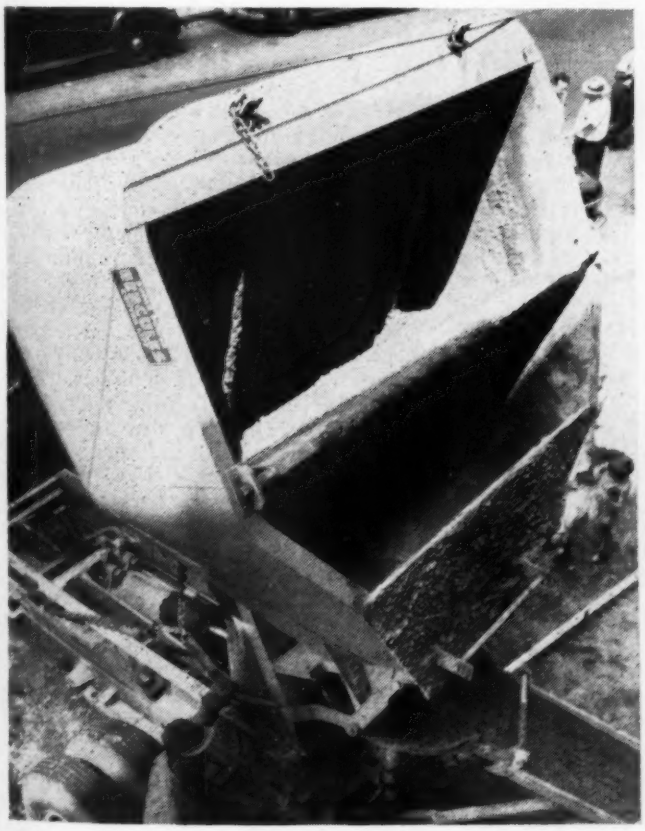
DELIVERY of central-mixed, air-entrained concrete in non-agitating truck equipment has made substantial progress in Toledo, Ohio, since introduction of the product by J. A. Nicholson in 1944. Some 150,000 cu. yd. of air-entrained concrete have been so placed to date, in all manner of concrete construction, and apparently with very excellent results.

Mr. Nicholson has standardized on air-entraining concrete and he rebuilt his entire business, in 1944, around the durability and placeability advantages that are now generally recognized as inherent to air-entrained concrete. He converted over from transit-mix delivery because he was convinced that concrete proportioned and mixed under closely-regulated plant operation could be delivered on the job without substantial change in physical character, by the use of air-entraining cement and in non-agitating truck bodies that could be modified to effect a minimum of segregation and ease of discharge.

All the concrete poured is of crushed blast furnace slag coarse aggregate and sand dredged from Lake Erie; the portland cement is mill-ground air entraining cement shipped from a single source; and the concrete is delivered distances up to 15 miles from the central mixing plant. Nineteen non-agitating trucks of several makes and designs are now in service.

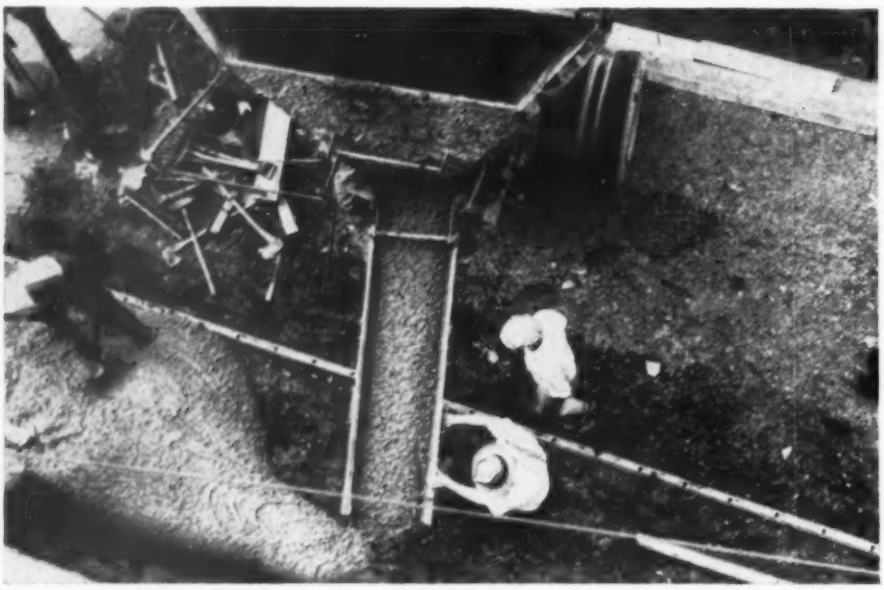
Central-Mix Plant

The feasibility of this type of operation depends a great deal upon satisfactory performance of delivery equipment, but starts with the mixing plant, which must be operated to produce uniform, designed concrete consistently under variable conditions of weather, aggregates and job use, in order that uniform concrete at point of delivery be attainable. In the Nicholson operation, mixing control is geared for a goal in consistency not



Dump body pouring concrete in full tilt position

Pouring sidewalk job of 5-in. slump concrete



Pouring sidewalk job with dump body delivered concrete. Note discharge of last fraction of concrete

to exceed ± 1 in. variation in slump at the contractors' forms.

The plant is on Maumee Bay, for dock delivery of sand, and is so located that 98 per cent of total sales of concrete are delivered within a 10-mile radius and some 60 per cent within six miles. The plant is of conventional design and construction. Slag and bulk cement are truck-delivered and cranes transfer sand and slag into two overhead bins each of 100-cu. yd. capacity. Bin capacity for cement is 485 bbl. Mixing is done in an 84 c.f. Smith concrete mixer of the front-end feed, tilting type which is preferred because fast discharge into dump bodies lessens the possibility of segregation.

Uniformity in slump, compressive strength and yield are sought, and Scientific Concrete Service Corp. (SC)² facilities are under lease for moisture control and the accurate weighing of aggregates. Moisture determinations of aggregates are taken as needed and weight compensation made accordingly on the scales. Mix design and the entire operation of the central-mixing plant is under the supervision of Kenneth L. Drew, superintendent, who is a trained concrete specialist, having spent nine years in concrete testing work with a testing laboratory in Toledo.

Important to attainment of the optimum degree of air-entrainment and its uniformity is control of the aggregates and mixing time. Practice is to purchase aggregates from a single source and to use a single brand of air-entraining cement that has proven uniformity. State specifications provide for 10-30 per cent minus 50-mesh particles in concrete sand but the high side of the tolerance, close to 30 per cent through 50-mesh, is preferred in order to attain sufficient degree of air entrainment for hauling without appreciable segregation. Sand bordering on the low limit of that size fraction contributes to a harsher, low air content concrete, which results in losing some of its ability to be transported. Coarse aggregates are 1½-in. slag for paving concrete and ¾-in. top size for thin sections of concrete up to 5 in.

The standard mixing time is two minutes but there are variations according to the type of construction involved, the distance of haul and the aggregates. For example, slag aggregate that is hot or dried out could result in a loss of slump in concrete as much as 3 in. between the plant and point of use. Practice, accordingly, is to maintain the slag aggregate in a moist condition, insofar as practicable, using live steam for heating during the cold months to implement steam coil heating, for that purpose.

Entrained air is held at approximately 4½ per cent and there is a loss of compressive strength in the concrete of approximately 5 per cent compared with normal concrete as formerly delivered, the lower slumps permissible for specific jobs offsetting in part losses of compressive strength due to air entrainment. Water content is seven per cent less by weight than for normal concrete. Traffic conditions and weather are factors that must be anticipated at the plant, where operations are governed to attain specified slump at the job, and an air entrainment meter at the plant is periodically used for the purpose of checking on slump.

Close-up of last fraction of concrete from body, on sidewalk job, showing consistency of concrete

A load of concrete is batched out at the plant in 90 seconds, from 1½ to 2 minutes are consumed in mixing, 15 to 20 seconds are required to load 3- to 4-cu. yd. of concrete into a truck body and something less than one minute is needed to dump a full load of concrete from bodies of the type now being adopted and which are described later. Concrete has been delivered as far as 20 miles in non-agitating equipment and 45 minutes is the optimum maximum time preferred for concrete to be held in the truck body. Distance is not a consideration unless roads have a "washboard" surface or are unusually rough.

Most of the concrete poured is in the 4- to 6-in. range of slump, an average of 5 in., and, of course, segregation is more of a consideration in the higher slump mixes, requiring greater care in plant control and close correlation between the plant mix and the product at destination.

In sub-freezing temperatures $CaCl_2$ solution is added in the proportion of 1 or 2 lb. per sack of air-entraining cement, and high early strengths are attained by the same addition of calcium chloride. The alternative, to attain quick set, would be to use high early strength normal portland cement with the addition of the air-entraining agent into the mixer. In Mr. Nicholson's opinion, if it became necessary to handle more than one brand of cement it would be desirable, if air-entraining concrete was desired, to add the agent into the mixer.

One of the outstanding jobs furnished air-entrained concrete in Toledo is the recently-completed 2,000,000 bushel capacity structure built for the National Milling Co., involving construction of storage silos 118 ft. high with 8-in. walls of reinforced concrete. Most of the 20,000 cu. yd. of concrete required was of 6-sack (specified for 3000 p.s.i.), 5-in. slump concrete with ¾-in. top size aggregate. The haul averaged four miles and the discharge was into a 4-cu. yd. field hopper. Compressive strength data for the entire pour disclosed excellent uniformity in compressive strengths attained at 28 days. The average was 3715 p.s.i. for concrete weighing 3819 lb. per cu. yd., from an average mix of 564 lb. of air-entraining cement, 1400 lb. of sand, 1570 lb. of ¾-in. slag and 285 lb. of mixing water. The compressive strength with a 5½-bag mix was 3480 p.s.i.

Haulage of Concrete

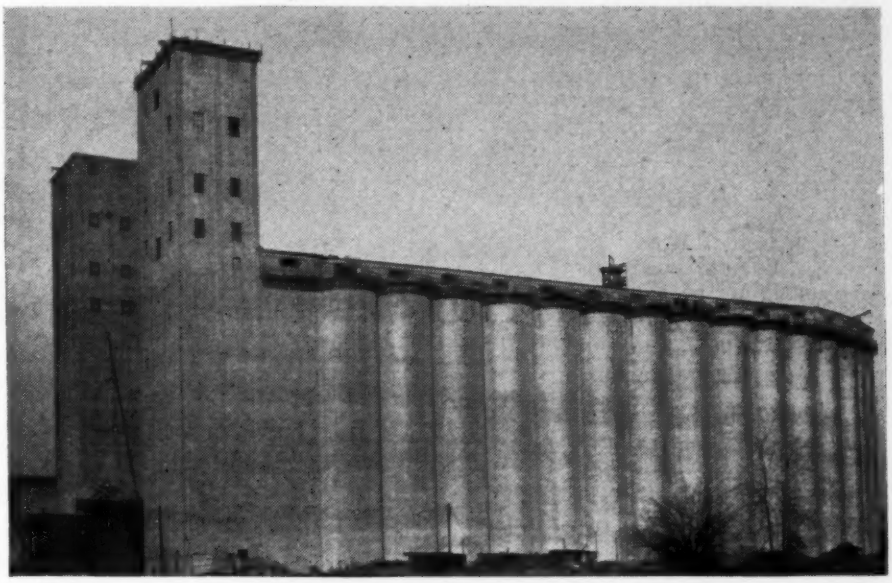
From the beginning, Mr. Nicholson has been experimenting in the field with non-agitating delivery equipment

under varying job conditions and he has tried many modifications of dump body design for delivery of concrete. Tests disclosed a 10 per cent downward movement of the heavier fractions of concrete in the type of dump bodies in use, and the consistency of concrete varied considerably between the first fraction of a pour and the last from a single load. Regulation dump bodies, however, proved satisfactory where control of discharge was unnecessary, when rounded corners and sides were built into the bodies. Compaction of concrete around the discharge gate and hangup of concrete were other difficulties experienced.

The "Hercules Concrete Dumper" illustrated herewith was invented by Mr. Nicholson in an attempt to overcome difficulties experienced in the field and is the first of a number of similar units soon to go into service. He got his basic idea on the National Milling Co. job, where he studied the re-mixing action that took place in discharging concrete into a 4-cu. yd. field hopper and determined to convert a hauling unit, in effect, into a portable field hopper. He studied means of correcting segregation that occurs during the haul and the elimination of segregation during discharge, in order that all fractions of a load of concrete might be of uniform consistency. Other considerations in the design were means to prolong workability time without agitation and to permit longer hauls of high slump concrete, high discharge, complete discharge, water-tightness and a central discharge gate for placement of the concrete.

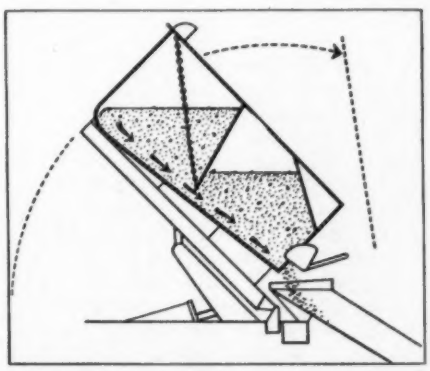
The new body is so designed that it provides a dual compartment hopper when moved to the initial tilting discharge position, so that there might be a pour of a homogeneous mass through simultaneous discharge through a central gate from the bottom and the top fractions of the mass of concrete. A baffle, pivoted on trunnions with 11-in. clearance from the bottom of the body, forms a front hopper and a back hopper, the baffle being so designed that all the concrete is free to move around the sides as well as below the baffle (adjustable to hold more plastic concrete back) when the body is in carrying position. When the body is raised to discharge concrete, the baffle assumes a tight fit to the tapered sides of the rear compartment.

This feature permits raising the body to a 45 deg. angle, exceeding the angle of repose of the heavier fractions of the concrete, before any concrete is discharged and without spillover, the mass of plastic concrete assuming a higher level and a lower level within the forward and rear compartments respectively. When the quadrant discharge gate is opened, this feature permits drawing concrete from off the mass that previously rested on the bottom of the container and, simultaneously, downward from the top of the mass out into the discharge chute. The box is tapered so that two-thirds of the concrete is carried in the front half, shifting the center of gravity well forward in the truck; and the taper terminates at a point forward of the pivot point. Predominance of the pressure on the discharge gate, when tilted in discharge position, is from the mass of concrete that was near the bottom of the container in hauling position, resulting in a scouring action clear from the top of the container when the gate is opened. Practice on long hauls, or when there are job holdups, is to lower the container from the 45 deg. position back to carrying position, which permits the concrete to sluice from one compartment into the other under the baffle. The cycle can be repeated and is said to prolong the permissible workability time.



Largest single project of air-entrained dump body delivered concrete in Toledo is this structure of National Milling Co., which was a pour of 20,000 cu. yd. of 5-in. slump concrete. Walls are 118 ft. high and only 8 in. thick

The unit is rated at 3-4 cu. yd. capacity, the difference being that when 4 cu. yd. of concrete are hauled the discharge gate is opened at a lower angle of tilt. It is mounted on a G.M.C. truck and has a standard Hercules hydraulic dump mechanism which raises the container to 75-80 deg. for complete discharge. The pivot is 18 in. behind the tail gate and the dumping principle is four point suspension with low hinging, designed to discharge into a ¾- or 1-cu. yd. concrete bucket. The body is moved upward to elevate the contents and move the discharge gate over the stationary chute. A folding chute provides lateral movement. Sides of the container have 60 deg. angle slopes to facilitate flowout. All non-agitating bodies are given a thin coat of No. 3 Diesel oil twice a day to facilitate discharge and, in the case of the newly-developed body, mainly for the prevention of an accumulative buildup of scale on the sides.



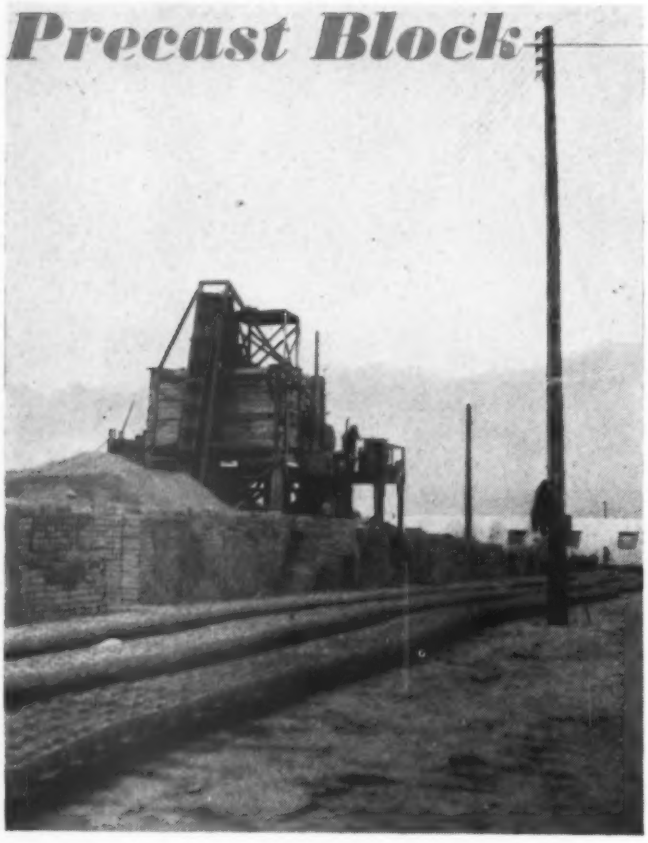
Showing relative levels of concrete assumed in the two compartments of body when tilted to discharge elevation

Performance of the new unit was observed in pouring concrete sidewalks for private owners and the city of Toledo shortly after the truck went into service. There was no visual difference in the consistency of any part of the concrete upon discharge. Apparently there was no decantation off of the lighter materials when the discharge gate was first opened and the last bit of the concrete appeared to be of the same slump as the first fraction dumped. The last fraction discharged was not stony and, according to the contractor, the cement finishers were pleased with the workability and finishing characteristics of that fraction, in particular, which so often ends the pour on a given stretch of concrete surface. This concrete was a 6-bag mix with ¾-in. top size aggregate and was delivered with a 4- to 4½-in. slump.

Marketing

Mr. Nicholson was among the very first producers of concrete to adopt

(Continued on page 165)



In the background may be seen the aggregate bunkers and the mixing plant. Block machine lays pallet supported block on the ground

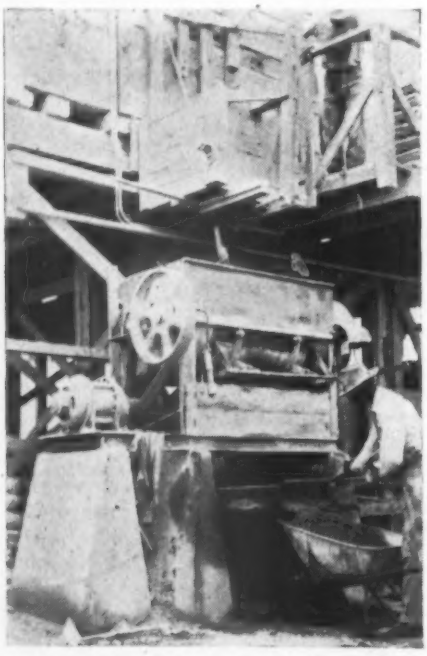
Make Concrete Block On the Site With Special Machine

Nelson Construction Co., Palm Springs, Calif., designs new machine which lays pallet-supported block on the ground as it moves forward. Production is 6000 block, 4- x 8- x 12-in. size, in 8 hrs.

By W. B. LENHART

PALM SPRINGS, Calif., was started about 25 years ago as a desert winter resort and its growth and fame has spread through the nation. Here sunshine is a commodity that has paid big dividends both to the seekers of sunshine and to the promoters of this desert paradise.

Homes built in this area must be designed for comfort during the heat of the day, and concrete masonry construction accounts for a large percentage of the new, elaborate winter homes built there during the past few years. On the desert new buildings were often built of adobe, and Palm Springs has some of this type of buildings. In recent years, however, concrete masonry has largely replaced adobe. If there are any advantages to adobe construction over concrete masonry, especially if the masonry is of lightweight aggregate, our observations have failed to record them.



Mixer is supported on concrete piers for convenience in loading wheelbarrows

The sprawling, single-storied homes in and around Palm Springs that in many instances are partially hid by high walls are considered by many to be the last word architecturally in this type of Spanish design. Palm Springs homes set the trend for the desert area for their orderly arrangement, beauty, and all-around usefulness. They may also be setting the trend for a novel departure in the method of manufacturing concrete masonry. A trend that may increase or stagnate or die—we know not which—but in any event these trends can be watched by others in the industry with considerable value to themselves. At Palm Springs, the Nelson Construction Co. serves as an excellent example of the trend towards manufacturing concrete masonry units at the *site of use*.

This company has developed a novel machine that might be said to lay bricks like a hen lays an egg, only in this case the unit lays five 4- x 8- x 12-in. bricks at the rate of 5000 to 6000 blocks in 8 hours. While watching this machine operate the three operators were making a cycle in 20 seconds, which if they kept up that rate all day, would produce 7200 block per 8 hours. Such a machine will bear watching.

The block manufacturing unit is mounted on four rubber wheels, the front section being devoted to the actual block production and the back half serves as storage for the raw concrete. One of the three operators hoes the mix into the molds sometimes assisted by a second man. Here it is vibrated and the top scraped off after which the five blocks are ejected onto a ⅝-in. plywood pallet mounted under

(Continued on page 162)

Front part of machine supports the block manufacturing unit, and the back part comprises a hopper for concrete. The ramp is for wheelbarrow delivery of the mix

Alatex Concrete Products, Inc., New Orleans, La., has large overhead bin storage capacity for aggregates and cement with screw conveyor and bucket elevator to handle bulk deliveries from rail siding to plant

Gravity flow of both cement and aggregates from overhead bins cuts material handling costs

Ready Mix Practice In Block Plant Design

By ROBERT A. LATIMER

INCREASING DEMAND for lightweight concrete masonry units in the New Orleans area prompted Alatex Concrete Products, Inc., to erect in that city a large, modern plant to supplement the production of its D'Hemecourt plant. The new plant, designated as the Broadway plant, has incorporated in its lay-out modern, efficient equipment and is a compact arrangement.

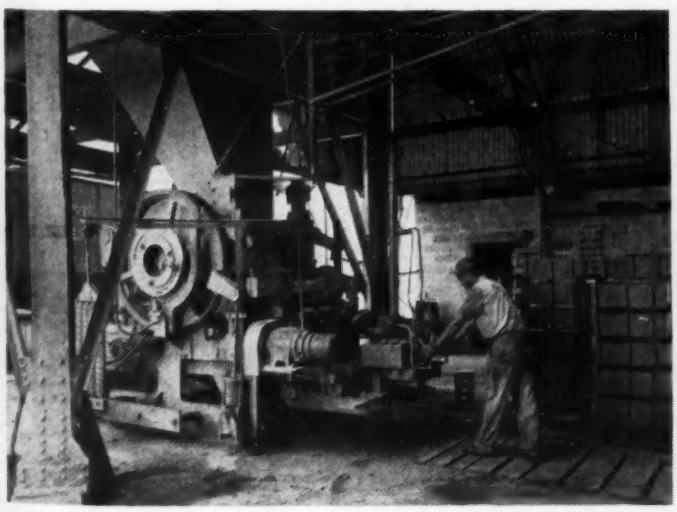
Lightweight slag and cinders are delivered to the plant in hoppered cars which discharge into an under track hopper from which a drag chain delivers the material either to a bucket elevator feeding directly into a 2-compartment aggregate bin or into a 60-ft. portable Barber-Greene belt conveyor which discharges into a raw material storage area in the yard. When the aggregate requires sizing and grading, by means of a trap gate it can be directed to another bucket elevator which discharges into a Telsmith Intercone crusher, is sized over Telsmith shaker screens and is then transported by belt conveyor to raw storage. This may sound rather involved but the system is remarkably simple in its operation.

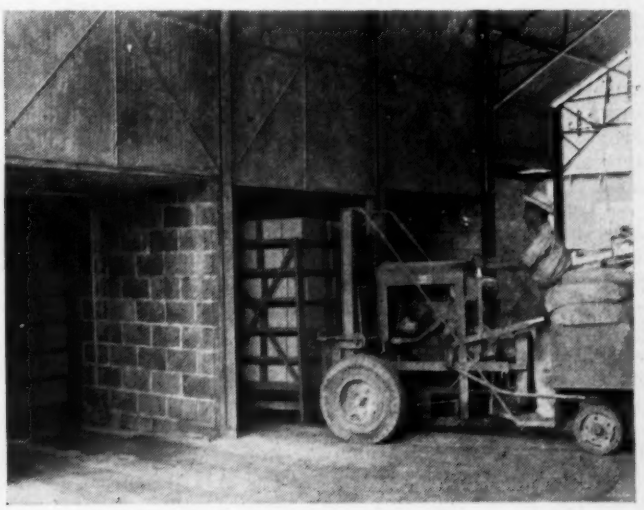
The overhead bin has two 120-cu. yd. aggregate compartments and a 425-bbl. bulk cement compartment. The cement is delivered in hopper cars and is fed through conventional screw conveyor to a bucket elevator and thence into the bin. Two 70-ft. bucket elevators raise the aggregates into the bin which is of special Blaw-Knox design.

Aggregates and cement are handled from the bins on by gravity. A combination weight and volume batcher for cement and aggregate discharges into a 50-cu. ft. Besser Mixer which in turn discharges into the hopper of a Besser Super-Vibrapac block machine. A gas-fired, automatic upright 50-hp. boiler furnishes steam at 170 deg. F. to eight curing rooms where the units are steamed for 12 hr.

Two Erickson fork lift-trucks handle the steel racks in the plant, in the yard, and are used in car and truck loading.

The plant buildings are constructed of concrete block side walls with corrugated asbestos roofing supported by steel trusses which have done away with necessity of any columns in the





Left: High capacity block machine. Right: Moving green concrete block into curing rooms

plant. This makes for ease in the handling of racks, etc., into kilns and thence to the yard.

The kilns are of concrete block wall and poured concrete roof construction with aluminum doors, the arrangement consisting of four on each side of a 24-ft. runway. Entry and egress is by a single door. After curing, the racks are taken out the runway to the yard for cubing and stacking. A ramp for railroad car loading has been constructed.

Only lightweight units are made. Underwriters' Laboratories, Inc., furnishes certificates on those block going into commercial and semi-commercial buildings where savings in insurance are a factor.

The majority of "ALATEX" blocks move through established building material dealers and are being distributed throughout Southern Louisiana and the Mississippi Gulf Coast.

With the motto of "Tops-in-Blocks," Lewis Lloyd and Phil Lala have put "ALATEX" in the forefront in its trade territory.

Precast Block

(Continued from page 160)

the molds. The bricks are pressed out of the molds by means of suitable plungers mounted over the assembly. As soon as the five blocks are on the pallet, the pallet and load are deposited on the ground under the machine. Then the whole unit moves ahead about 18-in., and the second cycle starts. The illustration shows the rows of concrete blocks on the ground. At the outset, the bare pallets are placed, one at a time, on a small metal frame that hangs almost on the ground and under the machine. At the proper point in the cycle the pallet is elevated upwards and under the mold. The machine is powered by a 1½-hp. gasoline engine.

At the time of inspection the concrete was being mixed at a centrally located mixer plant and then conveyed to the machine by wheelbarrows but some sort of mobile power carrier such as a Scoopmobile was being contemplated. The company has two of these block machines in operation with one mixer supplying the two units. Heavy aggregates purchased from the Metropolitan Water District are being used up to the present time.

Block are cured in the sun for 5 hours and then stacked in neat piles where they are sprinkled from time to time until cured to the manufacturer's satisfaction. Some calcium chloride is used in the mix. The plant supplies block for a large number of homes being built by the Nelson Construction Co., on El Camino Romona about five miles easterly from the business part of Palm Springs. H. H. Treat is in charge of the concrete masonry production for the Nelson Construction Co., the home offices of which are in Fresno, Calif. All the features of the machine have been covered by patent applications by the inventors.

Pumice for Water Treatment

INTRODUCTION of pumice to the field of water treatment is expected to be a boon to smaller cities where present day building costs have placed adequate treatment plants beyond their ability to finance, according to an article in *Western Construction News*.

The initial installation of a plant using pumice for water treatment has been made at Redmond, Ore., where two applications of the material are being tested. The pumice is being used in the filter beds of the plant, primarily to remove algae from the water, and filter bed plates are being constructed from a pumice-cement concrete, replacing the expensive carborundum plates generally used.

Treatment (peak demand is 2,500 g.p.m.) consists of screening, breakpoint chlorination by the application of 3.5 ppm. of chlorine settling in a 225,000 gal. settling basin, filtration, and aeration. The filtration, intended primarily for removal of algae, is done with the use of six filter beds, each with an area of 160 sq. ft., and intended for a 4-ft. water depth. The beds are equipped with the special pumice concrete plates.

Pumice for the plates comes from a nearby deposit. The pit-run material is scalped through a grizzly, then crushed through a 24-in. horizontal Symons disc crusher. From the crusher, it is passed over a screen with 3/16-in. mesh, separating the pumice into 3/16-in. minus and 3/16- to ⅜-in. maximum. The mix consists of 4½ cu. ft. of the fines, 3 cu. ft. of the 3/16- to ⅜-in. size, and 100 lb. of portland cement. After mixing in a horizontal paddle type mixer for 6 min., the batch is weighed into vibrating forms.

The plates, 11⅞-in. sq. and 1½-in. thick, are reinforced and are supported in the filters by ½-in. bolts which are embedded in the concrete floor of the bed, and held in place by a suitable arrangement of bolts and washers. A mortar of the same mix characteristics as the plates is used to fill the gap between the plates. The result is a uniform, porous platform with adequate strength to support the filter medium and water, and still permit the filtering water to flow through the platform itself. Tests indicate that flow through the plates will average about 5 gal. per min. per sq. ft. of plate area over an 8-hr. period.

Pumice was selected as a filter substitute for sand as the latter, in this case, was subject to excessive clogging by algae. Volcanic cinders, also tested, required too much backwash water.

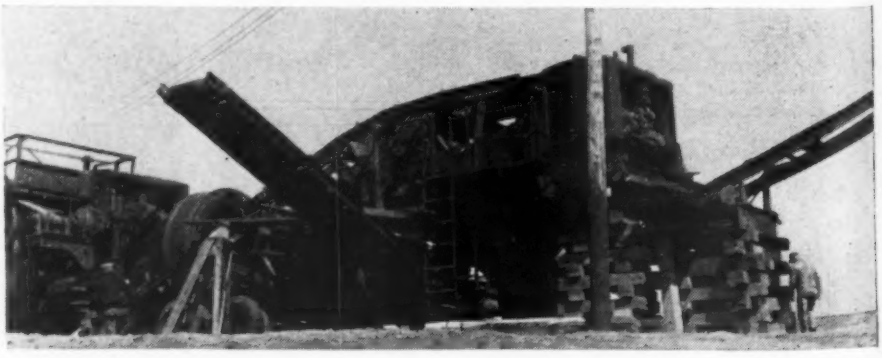
Aeration has not yet been provided for at the new plant, but pumice is expected to play a major part in the treatment. The clear water trough, which runs the length of the bank of filter beds and receives the filtered water, will be equipped with a pipe manufactured from the same pumice concrete as the filter plates. Rectangular in cross-section, the pipe will be 12-in. wide by 4-in. high (outside dimensions) with 1½-in. walls. It will be placed on low supports 2-in. above the bottom in the clear water trough and connected to a compressed air supply. Air pumped into the pipe will seep out through all four sides to provide a distribution of fine bubbles in the water.

The experimentation and development of the pumice concrete filter plates was carried out by water superintendent John H. Berning. Plates and aeration pipe are being manufactured by Deschutes Concrete Products Co.

Lightweight Aggregates

(Continued from page 156)

of the company, not to have all his eggs in one basket but to diversify his activities. The perlite and vermiculite processing plants are behind the film studio. In all new construction—both companies have undergone important expansion within the past 4 years—perlite and vermiculite have been used to a large extent and demonstrate well the advantages of these lightweight aggregates both for masonry and gypsum plaster. The company employs about 550 people at its main plant with nearly 150 sales representatives covering its territories throughout the country. There are some 9000 movie theatres under contract to display its advertising shorts.



Portable crushing and screening plant which is used to process perlite to proper size for treatment in a rotary kiln which expands the ore to five times its original volume

DESIGN CONCRETE HOUSE FOR RADIANT HEATING

Concrete floor slab designed for radiant heating being transferred from plant to out-door water tank. Dick Davies, left, guiding slab into position

Concrete beams and corner posts in position in house construction

By DAVID MOCINE

BY SEVERAL YEARS OF EXPERIMENT, Ernie Davies, president of Fabcrete of America, Columbus, Ohio, has arrived at a mix formula, type of vibration and curing cycle that gives high strength to pre-cast house units. Structural concrete members attain 3000 p.s.i. test strength in 7 days, using ordinary portland cement; concrete frame members for buildings hold reinforced concrete beams which can support 2000 lb. per lineal ft.; and a floor made for radiant heating will support 250 lb. of live load per sq. ft.

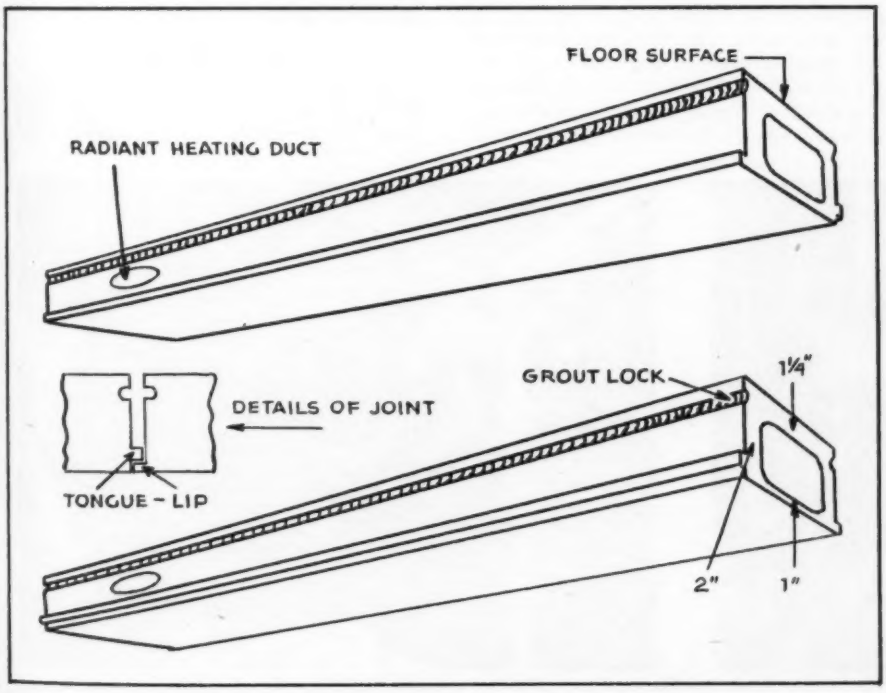
High strength is obtained by strict adherence to a cement-water ratio that has been worked out coupled with close aggregate grading (with ⅜-in. as the largest aggregate size used and fines closely held between 7 to 10 per cent of the sand by volume). With smaller particle size and more closely graded aggregate, a thinner cement paste cushion is used, with the resultant reduction in production cost.

A vibrating table working on an eccentric shaft, vibrating up and down only at 5000 r.p.m., is a third point stressed by the company, and according to Mr. Davies, this principle does not separate the constituent parts of the concrete mix. Usually equal amounts of sand and gravel are used in a ratio of 1 bag of cement to 5¼ parts of aggregate. Only sufficient water is added to make the mix plastic, with the concrete members being submerged in water for seven days after leaving the forms. Hydrated lime is sometimes used if the sand contains insufficient fines.

Forms are set up, ⅜-in. round reinforcing placed, oil sprayed with compressed air gun, and filled while on the vibrating table. They are then lifted off by a 2-ton Budget electric hoist on an overhead track. The forms are stored in the plant for 16 hr. then stripped and stacked in outdoor water tanks for six days, at the end of which time the units have attained full strength of 3000 p.s.i. Members are poured upside down, with the first cure allowed to set in this position, so that when the units are reversed, the reinforcing bars are correctly stressed according to the size and load expectancy of the unit. Largest member in production at present is a floor joist measuring 8- x 16-in. by 14-ft., and weighing 840 lb. In effect, a Fabcrete floor has a 2- x 8-in. concrete joist, doubled, every 16 in., with a 12-in. wide air duct between.

Expansion and contraction are reduced to a minimum by making a high strength concrete (Fabcrete of America uses a strong aggregate brought in by rail from northern Ohio because it is Mr. Davies' contention that compressive strength of concrete is in direct ratio to the crushing strength of the aggregate used in the mix).

Fabcrete of America is a corporation formed by the partners of Columbus Concrete Products Co. (see ROCK PRODUCTS, Sept., 1944, p. 84). Mr. Davies spent several years perfecting the forms and other details of the process known as Fabcrete, and the corporation is now ready to franchise concrete products plants to produce these homes on a production line basis. It is the intent of the Columbus plant to be in production of a 5-room house per week by the end of the year.



Details of concrete floor slab designed for radiant heating

Exterior view of plant, yard, and tower which houses four steel bins for aggregates and cement

Empire Building Material Co., Portland, Ore., manufacturing lightweight aggregates in conjunction with Northwest Aggregate, Inc. New block plant has ample curing capacity with five steam kilns

Meeting Big Demand For Lightweight Units

STARTING with a small hand machine about two years ago, the Empire Building Material Co., Portland, Ore., developed to a point where a new plant became necessary. This plant, completed late in 1946, is equipped with a Besser Super Vibrapac. The old plant has ceased production. Both these plants made block of hard aggregate and pumice, but just recently the company, working in conjunction with Northwest Aggregate, Inc., has started to manufacture its own lightweight aggregate near Portland, Ore., and sell it under the company's trade name of "Lite-Rock." This is an expanded shale product, and at first glance resembles the natural volcanic clinkers and scorias of the Southwest. Northwest Aggregate, Inc., is the name of the company manufacturing Lite-Rock.

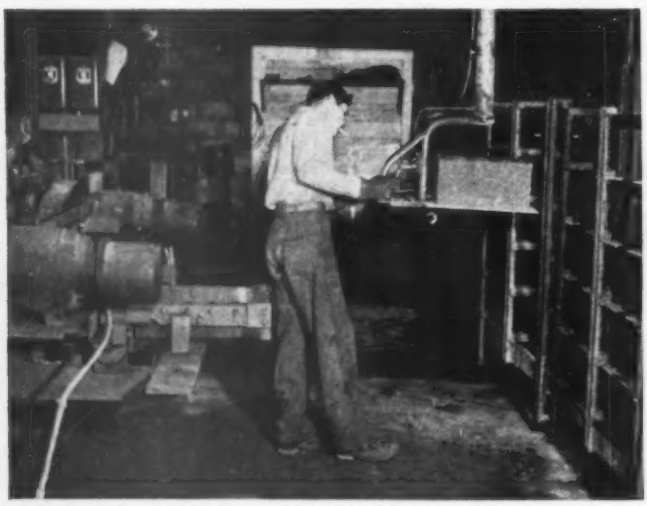
Lightweight Aggregate Plant

The Lite-Rock plant is located about 50 miles west of Portland, near Buxton, at the west portal of the Sunset Tunnel on Route 2 connecting Portland with Seaside, Ore. Here the company has a carbonaceous consolidated shale that when heated expands several times in volume. The shale deposit is drilled with jackhammers and is blasted out with light "shots." This breaks the material down so that it can be handled with a Scoopmobile that feeds a set of 16- x 30-in. Badger rolls driven by a Hercules gasoline engine. Rolls reduce the shale down to 2½-in. at which size (including fines) it is fed to a 6- x 60-ft. oil-fired rotary kiln. The expanded hot clinker falls to an inclined drag conveyor that loads a steel hopper over a Lippman pulverizer. This crusher reduces the clinker to minus ½-in. at which size it is loaded to 20-cu. yd. dump trucks for delivery into Portland. The kiln is driven by a White motor with a Le Roi engine on the final crusher. The kiln burner uses 10 gal. of oil per cu. yd. of Lite-Rock, fired by a Ray oil burner that has a capacity of 85 gal. per hr. The pulverizer only operates when trucks are being loaded. The kiln is driven by a White motor with a Le Roi engine on the final crusher. The kiln is fired by a Ray oil burner that has a capacity of 85 gal. per hr.

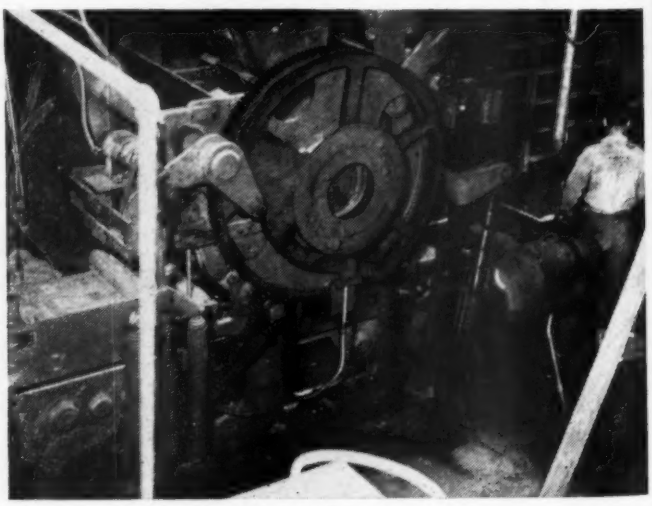
The plant, which has a capacity of about 100 cu. yd. per 24 hours, produces an excellent lightweight material weighing about 9 lb. per cu. ft. An 8- x 8- x 16-in. block made from this material weighs 23 lb. At present all the Lite-Rock plant output goes to the new plant of the Empire Building Material Co., but later it is planned to sell to other block manufacturers. The price for the product is such that it will compete with pumice, a very popular aggregate in the district. Lite-Rock is said to give greater strengths than pumice, and still retains all the advantages of insulation, nailability, etc.

Block Plant

The new block plant of the Empire Building Material Co., is of concrete block construction, using heavy steel



Pneumatic off-bearing hoist to move block from machine to racks



Showing high-production block machine in action

Lift truck moving loaded rack of concrete block from block machine to curing room

"I" beams to carry some of the weight. It is so constructed that trucks can back over the top of the plant and discharge to one of four bins; three for aggregate and one for bulk cement. From there on the material flows by gravity.

From the bins, the aggregates are weighed in a single overhead scale with the weighing hopper discharging to the 50-cu. ft. Besser mixer. Water is metered to the mixer. The mixer dumps to the hopper over the block machine. Toledo scales are used on the batcher.

Five steam kilns are loaded and unloaded by a Mercury platform lift truck. After curing for 7 to 8 hours in the steam kilns, the blocks are hauled to the storage yard. Some of the blocks are cubed so they can be handled direct with the lift truck but many sizes are piled on wooden pallets for further handling.

The company, with the aid of a Clipper masonry saw, can supply the users with an infinite number of sizes and shapes of concrete blocks. A charge of 10¢ for each cut is made.

Blocks are delivered in and about Portland in the company's own trucks, and a delivery charge of 3¢ per block is assessed for city deliveries.

Offices of both companies are located at 1205 SE Grand Avenue. H. L. Priest is president of the Empire Building Material Co., Frank Spangler is vice-president, and C. H. Farrington is secretary and treasurer. Bob Alton is foreman of the block plant. The officers of the Northwest Aggregate, Inc., are: K. C. Bergstrom, president; R. E. Brooke, and Harry Alton, vice-presidents. Mr. Alton acts as superintendent of the Lite-Rock plant.

Wood-Concrete

DURISOL, INC., will build the first of nine proposed plants at Beacon, N. Y., at a cost of $500,000, for the production of Durisol, a low-cost insulation material combining the qualities of both wood and stone.

A light-weight slab, the product can be saw-cut and nailed, its basic ingredient consisting of wood fibers, chemically treated to render them fire-resistant and termite-proof, mixed with cement.

Ready Mix

(Continued from page 159)

the non-agitating form of delivery and was the first producer of transit-mixed concrete to convert entirely to a central-mixing plant with dump body delivery. Extraordinary demand for concrete the past few years presented favorable conditions for the introduction of the then new air-entrained concrete to the uninitiated contractor and he capitalized on the opportunity to the tune of some 150,000 cu. yd. of air-entrained concrete delivered.

There are some unusual points of interest to his marketing practice as well. Prices are based upon a zone system and according to the class of user, whether the customer be an individual, a contractor or large industrial builder. One price prevails for each class of user for hauls within a two mile radius of the plant. Rates are scaled upward for each ½-mile increment of radius up to 5 miles and then for each increase of one mile. Concrete is sold on cement bag content and, where compressive strength is specified, quotations are based on a given number of sacks of cement which is calculated to develop the specified compressive strength with factor of safety. An adjustment of 30¢ per half sack of cement is made, up or down, according to conditions. All private users are quoted a six sack price as a precaution because of the usual inexperience of individuals in handling concrete. The entire pricing system is based upon selling durability along with compressive strength.

Considerable concrete is sold "over the counter" to contractors and individuals who pick up concrete in ordinary dump body trucks and a separate dock price has been established for those sales. From 15 to 20 per cent of total volume is delivered into customer-owned trucks. Non-agitating trucks are used to haul aggregates as well as concrete, and regularly transport crushed slag in 7½-ton loads from the nearby producing plant.

Mr. Nicholson has noted much improvement in his customer relations the past several years. Users know that the concrete cannot be mixed or re-mixed at the job so they make it a point to have the forms ready for quick discharge. Waiting time charges have practically stopped, according to his experience, and there are few arguments over slump since there is no possibility of adding water to the concrete at the job.

Rights to manufacture and sell the Hercules Concrete Dumper in the United States have been sold to Hercules Steel Products Corp. by the inventor who is retained by that concern on a consulting arrangement. It is anticipated that ten new units will go into service in Toledo within the next few months.

Add to Ready-Mix Plant

PARKWAY CONCRETE CO., Trenton, N. J., plans to increase its facilities for ready mixed concrete by the installation of a sand and gravel plant on its property at Duck Island. Edward Budney, president, stated that he expects the plant to be in operation by mid-April. No attempt will be made to supply the market with sand and gravel except for the by-product sizes which will be marketed as pea gravel and ballast. Mr. Budney is also president of the Premier Oil Co., and plans to install an oil dispensing plant on Duck Island in the near future.

New Brick Process

WILLIAM R. BAUER, under a graduate fellowship at the Ceramics Research Station, Rutgers University, New Brunswick, N. J., has evolved a process for brick manufacture that uses fly ash and slag, plus a plasticizer. The raw materials are ground and mixed with the plasticizer and extruded through a standard brick machine, and subsequently dried and fired in a kiln. The fellowship was set up by G. and W. H. Corson Co., widely known lime manufacturers.

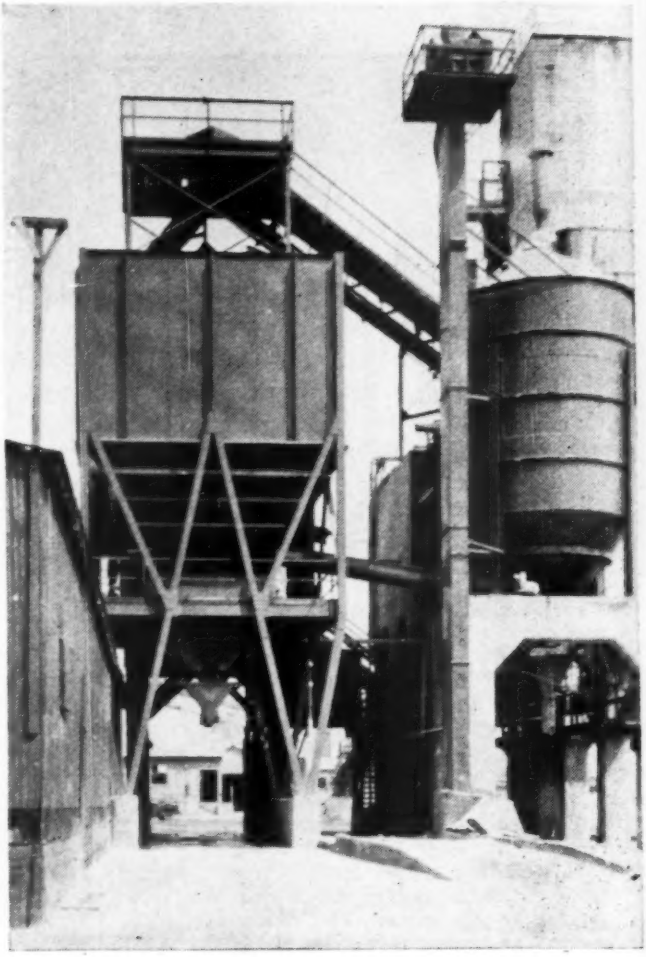
Association Incorporates

NEBRASKA CONCRETE MASONRY Association, Lincoln, Neb., has recently been incorporated as a non-profit organization. Signing the articles of incorporation were Earl Peterson, Omaha; Alfred Paulsen, Cozad; Chris Handley, Chappell; Paul Moser, Lincoln; and H. J. Young, Wahoo.

Electronic Controls Speed Up BATCHING

Consolidated Rock Products Co., Los Angeles, Calif., completes two new ready mixed concrete plants. Latest type batching equipment

By WALTER B. LENHART



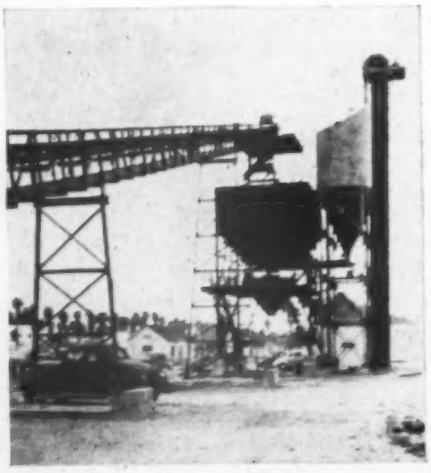
Aggregate bins with batching controls below at Alameda street ready mixed concrete plant. Note bulk cement silo supported on concrete piers, to the right, of adjacent aggregate plant

TO KEEP UP with the growing demand for ready mixed concrete in the Los Angeles area, and, at the same time to deliver a quality concrete based on sound engineering mix design and on accurate weighing of the cement and aggregates going into the mix, the Consolidated Rock Products Company has just completed two new ready mixed concrete plants in the downtown sections of Los Angeles. The first, completed within the last few months, is located on Alameda Street. Many of the members of the National Ready Mix Concrete Association will recall this plant. The new plant which replaces an older one at the same site, uses the automatic weighing of aggregates and cement through electronic controls that were designed and installed by the Conveyor Company of Los Angeles. Two separate electronic scales are used; one for cement and one for the aggregate. On the Kron dial are arranged five settings for cement and six for the aggregate. On the latter the weighings are cumulative. When the pointer of the dial scale reaches the preset point, the electronic device functions and automatically cuts off the flow of material. It is extremely accurate and rapid turning out 100 batches per hour. The batcher is a 4½ cu. yd. capacity unit.

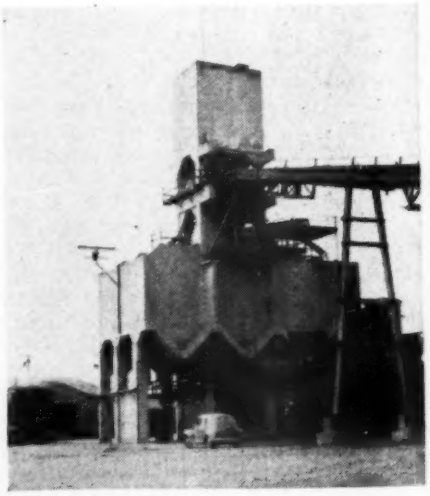
The weighing hopper which has a separate weighing compartment in the center of the main hopper, is so devised that it is practically dustless. Six aggregate gates supply the outer hopper. A Repeat-O-Meter is used for the water. Bulk cement is delivered to the plant by trucks or by rail.

There are eight bins, six for aggregates and two for cement, the latter delivering to the weighing hopper by two separate screw conveyors. The aggregate bins hold 55 tons each, but alongside the new plant are some concrete bunkers that can supply an additional 600 tons of aggregates. Delivered by rail to the plant, the aggregates are dumped to a track hopper and an inclined belt delivers the material to the older bunkers. Spencer Smith is foreman of the Alameda plant.

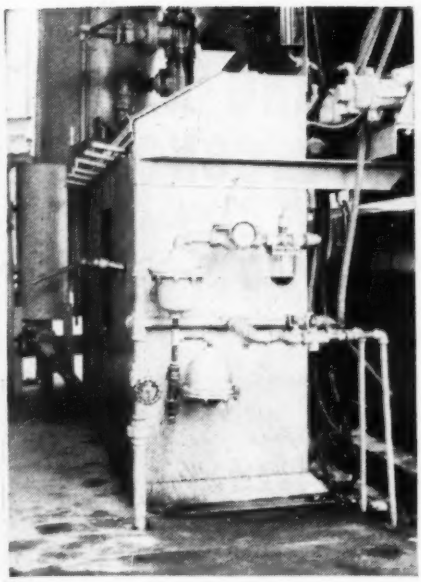
The second new plant is at 2010 W. Slauson Avenue, and will in part embody the same Conveyor Company electronic weight controls as the Alameda plant except that the cement will be electronically controlled and the aggregate manually. The cement scale here will have 5000 lbs. capacity and the aggregate 20,000 lbs., using Kron scales. It also replaces an older plant that has been in operation at this site since 1924. The new plant is of steel construction throughout, and



Long conveyor inclining up to aggregate bins over batcher at new Slauson street plant. Bulk cement steel silo, to right



Reinforced concrete sand and gravel bins at Alameda street plant



Neat control installation at Alameda street ready mixed concrete plant. Similar controls are installed in the Slauson street plant

was designed and erected by the staff of the Conveyor Company.

Cement will be delivered by rail or truck and elevated from a track hopper to steel silos, there being two of the latter and six bins for the aggregate.

A 24-in. belt conveyor has been installed under the old bins used for commercial aggregate. Twelve bins with a capacity of 200 tons, each served by an air-electrically controlled gate will deliver the material to the belt which elevates and conveys the material to the top of the ready mixed concrete plant. All the equipment is new. The solenoid control switches for the air-gates will be on the batching operator's desk.

New A.S.T.M. Committee

A NEW TECHNICAL committee of the American Society for Testing Materials has been organized and will be known as Committee C-2 on Magnesium Oxychloride Cements. These cements have been used principally as an interior flooring or a base for interior flooring surfaces such as asphalt tile or terrazzo. DR. L. S. WELLS, National Bureau of Standards, was elected chairman of the new committee; DEAN HUBBELL, Mellon Institute, was named vice-chairman; and G. J. FINK, Oxychloride Cement Association, will act as secretary. The organization consists of an executive subcommittee composed of the officers and subcommittee chairmen; a subcommittee on methods of test, consisting of five members, with W. J. Riley, Westvaco Chlorine Products Corp., as chairman; and a subcommittee on specifications and definitions, with a membership of six, and with E. H. Dhein, U. S. Corps of Engineers, as temporary chairman. The scope of the new committee will cover the formulation of specifications, methods of testing, and definitions relating to magnesium oxychloride cements, and research.

California Mineral Production

PRODUCTION of "miscellaneous stone" in California in 1946 had the greatest value for any year on record and was exceeded in tonnage only by that of 1942, according to a report from the State Department of Natural Resources, Division of Mines. A total of 41,610,212 net tons of miscellaneous stone, including sand, gravel, crushed rock, rubble, and rip rap, valued at $27,671,788 was produced last year as compared with 29,449,484 tons valued at $20,207,351 in 1945. Los Angeles led all other counties with a stone output value of $6,100,968.

The sand and gravel produced in 1946, including 72,226 tons of molding sand valued at $254,396, totaled 24,962,267 tons valued at $16,305,222 as compared with 16,329,020 tons valued at $10,371,647 in 1945. The output of molding sand for 1945 was 44,447 tons valued at $155,567.

Output of crushed rock, rubble, and rip rap totaled 16,647,945 tons in 1946 valued at $11,366,566, an increase in both amount and value as compared with the 1945 total which was 13,120,464 tons valued at $9,835,704. Of the total of tons for 1946, 3,399,439 tons valued at $2,932,236 were used as macadam and ballast; 533,524 tons valued at $602,144 were used for rubble and rip rap; 1,175,854 tons, valued at $993,628 were used in concrete; and 11,539,128 tons, valued at $6,838,558 were listed as unclassified.

Cement Production

BUREAU OF MINES reports that production of finished portland cement during June, 1947, totaled 15,971,000 bbl. or 10 per cent greater than that reported for June, 1946. Mill shipments in June, 1947, reached 18,179,000 bbl., a figure 25 per cent above that reported in June of the previous year. Stocks of finished portland cement on June 30 were 17,180,000 bbl., an increase of 44 per cent over that reported for June, 1946. Demand for cement, as indicated by mill shipments, was higher than in June, 1946, in all but two districts.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of June, 1947 and June, 1946.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	June 1947	June 1946	May 1947	Apr. 1947	Mar. 1947
The month	81.0	73.0	66.0	74.0	69.0
12 months	74.0	54.0	74.0	73.0	72.0

Pavement Yardage

AWARDS of concrete pavement for August and for the first eight months of 1947 have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During Aug. 1947	Square Yards Awarded During First 8 Months of 1947
Roads	1,468,269	15,414,325
Streets and Alleys....	1,737,082	10,373,852
Airports	79,420	1,087,498
Totals	3,284,771	26,875,675

Modular Concrete House

PORTLAND CEMENT ASSOCIATION, Chicago, Ill., is distributing plans, specifications and detailed drawings of an industry-engineered house as a basis for fire-safe all-concrete houses to be built with modular size concrete units, including cement asbestos shingles. The Association states that modular concrete houses can be built to suit any family's preferences in size and architectural style, and by use of modular size materials coordinated with modular design, eliminate expensive cutting and fitting on the job, thus reducing building costs.

Taken from the detailed drawings inside the folder are some interesting suggestions, such as the cast-in-place concrete basement stairs; and the interesting blending of concrete block load-bearing walls with cement asbestos siding above the window line for an interesting architectural effect.

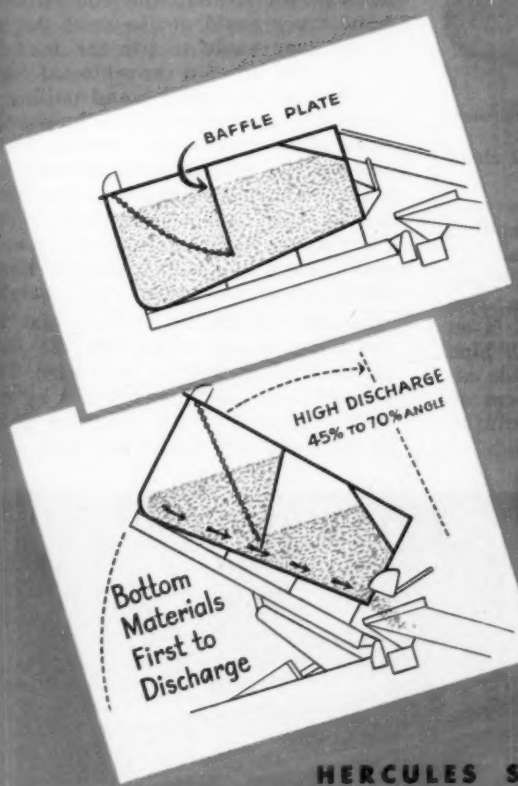
Artist's drawing shows P.C.A. firesafe concrete masonry adaptation of the industry-engineered house. Use of modular size materials coordinated with modular design eliminates expensive cutting and fitting on the job, thus reducing building costs

HERCULES
CONCRETE BODY

DESIGNED BY CONCRETE ENGINEERS . . . BUILT BY DUMP BODY SPECIALISTS

Be Ready to revise your ideas on delivering air-entrained concrete when you see the new lightweight, all-purpose HERCULES Concrete Body in operation, for here is an advanced conception of modern concrete hauling and placing methods that will open up countless opportunities for profitable operations.

Economical delivery of quality concrete—and of aggregates, when concrete-pouring is completed—makes the new HERCULES Concrete Body the busiest piece of equipment you'll ever own or operate! Tested and proved in on-the-job service, the HERCULES Concrete Body is ready to go to work for you. Complete details are available through leading construction equipment dealers . . . or write direct to the Hercules Steel Products Corp., Galion, Ohio for Preliminary Bulletin CD-1.



UNLOADING ACTION

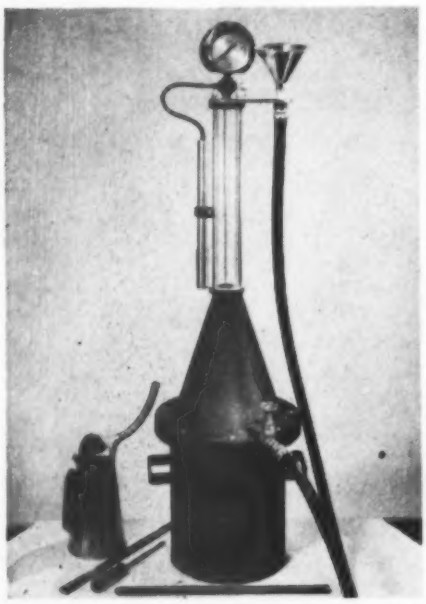
The HERCULES Concrete Body provides fast, complete discharge of the entire load, delivering the same uniform mixture that was loaded at the central mixing plant. The initial opening of the discharge valve is made when the body is raised to a 40°-45° dumping angle. The dumping angle is gradually raised to 70° for the final clean discharge of the load. Furthermore, the scientifically placed baffle plates, in combination with the pressure created by raising the body to discharge position before opening the valve, provides a smooth flow of concrete from the BOTTOM OF THE BODY FIRST. This action, shown in the diagrams, prevents placing of wet, lighter concrete from the top first and insures a uniform mix discharge at all times.

HERCULES STEEL PRODUCTS CORP., GALION, OHIO

NEW MACHINERY

Air Meter

HOGENTOGLER & CO., Chevy Chase, Md., is the manufacturer of a meter designed to measure accurately the amount of air entrained in concrete.



Meter to determine amount of air entrained in concrete

It is known as the Klein-Walker air meter, a cooperative development by W. K. Klein and Stanton Walker.

This device employs the principle of Boyles law in computing the air content from the reduction of volume of the concrete on application of a given pressure. In the latest type air meter, shown herewith, the standpipe is graduated directly in percentage of air. The measure is filled with concrete, the top replaced, and the device filled with water. Pressure is applied (determined from a chart) and the air content read on the standpipe.

The apparatus is of strong but light welded construction with a plastic standpipe for field use. A high cone is used to prevent air from being trapped, and hose fittings are provided for quick filling from a faucet, hose or bucket. The air meter is obtained in two sizes, ½-cu. ft. or 1/5-cu. ft.

Lintel Machine

KENT MACHINE CO., Cuyahoga Falls, Ohio, is now in production of its vibratory machine for lintel manufacture, the Lintelator. This is the first machine for mechanical lintel production offered to the trade and should enhance the manufacture of lintels through faster production and lessened worker fatigue. It will form 8- x 8-in., 7¾- x 7¾-in. or 6- x 6-in. lintels in any desired length up to 6-ft. The lintel is formed in a four sided mold, one side of which is the pallet. While the form is being vibrated, the top side is held in place by compressed air; and when the form is sufficiently compacted it is rolled over onto the pallet, the adjustable ends removed and the finished lintel transferred to curing rack by pneumatic off-bearer.

Heavy Duty Lift Truck

MIXERMOBILE MANUFACTURERS, Portland, Ore., has brought out a lift truck of unusual design in which hydraulic power steering, hydraulic lift and hydraulic tilt control give the operator steering ease and positive control of the load. An enclosed cab is available, but not standard equipment, to give the operator protection from the weather when working out of doors.

The hydraulic lift will handle 6000 lb. to a height of 8 ft., or 4000 lb. to 11 ft., yet collapse completely into the truck body like the bellows of a camera. With the lift in lowered position, the truck has a very low head clearance.

Lift truck with telescoping boom attachment

A variety of quick-change attachments are available to permit handling different kinds of bulky materials. Attachments include forks to handle pallets, lumber, etc., and scoop type buckets in both ½-cu. yd., and ¾-cu. yd. capacities for sand, gravel, pipe, and other heavy odd-shaped loads can be easily handled with the boom attachment, according to the manufacturer.

Hand Truck Handles Sacks On Pallets

TWIN-TILT TRUCK CO., Cincinnati, Ohio, is now in production of a hand truck which was designed to eliminate rehandling individual sacks or containers each time they had to be moved. This was done with the aid of individual, small pallets to support a stack of sacks.

Hand truck with auxiliary frame to permit handling sacks on pallets

Sackrete, Inc., with which this company is affiliated, developed the hand truck after experimenting with the ordinary hand truck in its own plant. It was found that the conventional hand truck could not be used. An attempt was made to lift the load by sliding the lip of a conventional hand truck under the pallet and pulling it back. It was impossible to budge the load; there just wasn't enough leverage for the average man to move the load. With the wheels as the pivot point, which was more than 15 in. from the load center of gravity, a man would have to exert a pull of about 350 lb. to counteract the load weight.

It was finally determined that an auxiliary frame would tilt the load to the hauling position with ease. The proper pivot point was found by experiment, and as the leverage ratio of the auxiliary frame mounted on a

Vibratory machine for lintel manufacture. The Lintelator is first machine produced for this purpose

separate shaft was about 30 to one it was possible to tilt the load on to the main frame of the truck with a momentary pull of only about 30 lb. The problem of a shifting load was solved through the use of a lip on the auxiliary frame at a right angle to the upright member which made it pos-

Tilting hand truck in position to raise sacks

sible to tilt the entire load evenly, keeping the stacks in alignment.

It is easy to operate. In approaching a stack of sacks, the auxiliary frame is tilted forward just enough to allow the lip to go under the loaded pallet. After the truck is in position, a slight pull is exerted on the handle of the auxiliary frame and the load is tilted toward the handle shafts. The load is then pulled to a balanced position on the wheels and is ready to be moved off. To place the load in stock without restacking, all the operator does is to approach a row of stacks, allow the load to move forward to a standing position, and then push the auxiliary frame upright. The truck is then pulled back leaving the standing load on the pallet.

The truck has a fully welded frame, and the wheels are 2½ in. by 8 in., rubber-tired, and with roller bearings for ease in moving loads of more than 1200 lb.

Lintel Specifications

IN A RECENT REPORT by the National Concrete Masonry Association, specifications have been drawn up to cover reinforced concrete lintels for spans of 7- to 14-ft., together with design data and a table of safe loads. The tables assume a 28 day compressive strength of 3750 p.s.i. for the concrete.

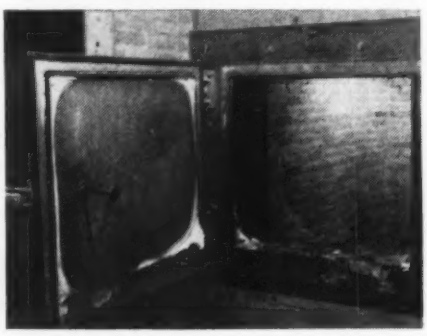
GALLATIN INDUSTRIES, INC., Bozeman, Mont., manufacturers of concrete block and precast concrete septic tanks, are expanding to include the sale of pre-mix concrete, Roy E. Ayers, president, and Fred Browning, manager, have announced.

Manufacture Perlite Concrete Block

By W. B. LENHART

PRODUCTION of perlite in Arizona is becoming an industry of increasing importance to the Southwestern users of lightweight aggregates. Perlite is a volcanic rock which, when heated, exfoliates until the resulting material resembles pumice, but in many instances is lighter than that lightweight concrete aggregate. In several cases the expanded rock will weigh 12 to 14 lb. per cu. ft. and concrete aggregate made from it (4 to 1 mix) will weigh 53 to 56 lb. per cu. ft. Thus the resulting concrete is lower in specific gravity than water and will therefore float on water. It has a low thermal conductivity and is an ideal material for concrete insulation blocks, partition tile, roofing slabs and for general insulation purposes. Concrete blocks made from perlite have a compression strength of up to 1400 lb. depending considerably on the mix ratio, curing, etc. It ranges in price slightly higher than pumice as a general statement, mainly because perlite deposits discovered in the West so far have been in remote areas and subjected to rather severe freight rates.

In Arizona, near Superior are large deposits of cheaply mined crude perlite. Several companies have developed burning techniques to commercial proportions, and are now marketing the expanded material throughout the Southwest, reaching as far east as the Dallas, Texas, area and into Los Angeles.



In a freezing test, the woodwork and metal collected frost but the perlite block interior did not

One of the pioneer companies in this field is the Chemi-cote Perlite Corporation of Phoenix, Ariz. At present the crude rock is shipped to its plant in Phoenix where the material is processed, sized and sold usually in paper or burlap bags. A new plant is now under construction near Superior which will consist of primary and secondary crushing equipment with vibrating screens used for sizing and also between primary and secondary crushing. Belt conveyors will be used. The plant in Phoenix will produce three-fourths of a car load per day, but the new plant is designed for a production of five carloads in 24 hours.

Testing beams made wth perlite concrete aggregate

The Superior, Ariz., crude perlite is a light colored rock for the most part although some dark material is present. When expanded the material is white in color and resembles 10-mesh pumice.

The Chemi-Cote Perlite Corporation, under the direction of Duncan MacDonald, president; Leslie J. Mahoney, architect; and Otto Janssen, architect's engineer, made some interesting tests to show the properties of perlite when used in concrete. In one test a concrete beam of perlite aggregate was poured, the beam having a cross section of 10- x 14-in., and without the reinforcing rods would have floated in water. On a span of 12 ft. this beam was loaded with 150 sacks of portland cement without rupture and without serious deflection. An interesting feature relating to de-

Small house erected in the vicinity of Phoenix, Ariz., of block and roof slabs made with perlite concrete. Materials are lightweight and have excellent insulation qualities suitable to this climate

flection was that at first there was no deflection at all when measured with a deflectograph, however, a short time later the deflection became .063 in. and after standing overnight deflection rose to .067 in. When the load was removed the deflection swayed back to .018 in. and after another 12 hours the beam showed zero deflection, thus showing its elastic properties. Perlite concrete for the beam was a 4 to 1 mix and, after curing for 30 days, had a weight of approximately 53 lb. per cu. ft. without re-inforcing. Three ½-in., deformed reinforcing rods, placed 1¾-in. from the bottom of the beam and 1½-in. from the side, were used. It was said that no cracks appeared in the beam and there was no apparent shear around the rods.

In another test, perlite concrete block subjected to low temperatures (minus 40 deg. F.) showed low thermal conductivities. It developed that when the blocks were raised in temperature to minus 10 deg. F. ice and frost collected on the steel piping inside the freezing unit and also collected on the interior wood lining, but no condensation of any kind on the perlite blocks. W. A. Nickerson is vice-president of the Chemi-cote Perlite Corporation.

Side Shifter

TOWMOTOR CORPORATION, Cleveland, Ohio, has brought out a fork lift truck accessory, known as the Side Shifter, which permits the operator

Fork lift truck equipped with side shifter to move loads side-ways in stacking

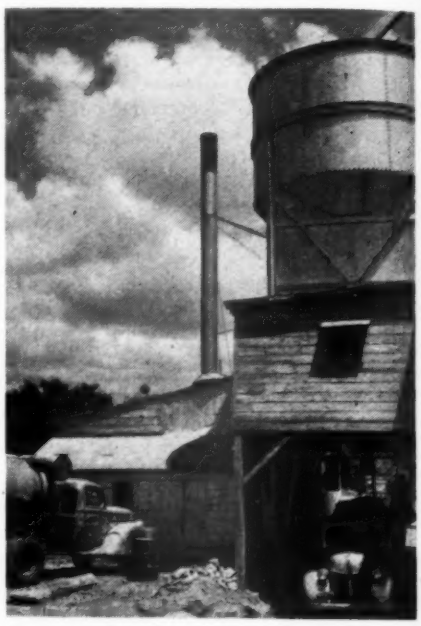
to pick up or deposit a unit load in an exact location without repositioning the truck itself. It provides lateral movement of a load, on forks or pallet, to either side.

Hydraulically operated through a sensitive, double-acting cylinder controlled by a lever mounted convenient to the operator, the side shifter will move the carriage face and forks a distance of 3½ in. in either direction. This accessory is designed to operate with standard Towmotor forks or Priester or Schmidgall forks.

W. L. MATTOX has started the production of concrete block at Newark, N. J., at the rate of 1400 per day. The company also carries "bull nose" corners, window sash block, and limestone concrete block from the Marble Cliff quarries.

Ready-Mix Plant Sold

KOKOMO READY-MIXED CONCRETE CORP. was recently bought by W. L. Covalt and C. Newall from C. W. Botts, who was for many years owner-operator of the plant. Mr. Covalt is now president and manager of the company while Mr. Newell, a lawyer, is a silent member of the firm.



Ready mixed concrete plant recently taken over by new owners

In the little time that is left the new president from his duties of overseeing the mixing, delivering and placing of 200-cu. yd. of concrete per day, he is looking for some allied line of work to keep the crew busy during the winter off-season. When some plan is finally evolved, he will not only keep his capital and plant busy on a 12 month basis, but will also be able to retain experienced help for the busy summer season.

The company operates a fleet of seven transit mixers, ranging from 1¾- to 3-cu. yd., including Blaw-Knox, Rex, and Jaeger equipment. Three standard mixes, 3000, 3800, and 4200 p.s.i., are made, plus many special orders. Air entraining Darex is added when specified by the contractor. Delivery of bulk cement from weigh bin to mixer truck is expedited by means of compressed air introduced directly into the hopper. Sacked cement is kept on hand for customers.

Mr. Botts, retired, has bought a fishing and hunting lodge on Lake Houghton in Michigan's Upper Peninsula.

New Equipment

CONCRETE PRODUCTS Co., Irving, Texas, has recently installed overhead bins for aggregate storage with a bucket conveyor on 35 ft. centers from a car hopper for charging. Under the bins is located a travelling weigh hopper. A new Erickson fork lift truck has also been added. Mr. C. J. Wilkerson is owner.

Material Grading for Concrete Products

MOST PLANTS have available the usual grading of commercial building and paving sands which have certain tolerances of percentages retained on the No. 3, 4 and 8 screens. In making small machine tamped sewer pipe, these sizes are the coarsest that can be used in the thin walls and so must be considered as rock, according to a paper titled Grading of Materials and the Manufacture of Concrete Products, recently released by the Concrete Pipe and Products Association, Seattle, Wash. Washington state requirements for paving sand permits from 63 to 88 per cent passing the No. 8 screen, while building sand requirements specify 85 to 95 per cent passing No. 8 screen; hence building sand gives better control for pipe mixes.

The smaller the size of pipe being made, the more closely the material must be graded, and in sewer pipe 4- to 10-in. inclusive, the material should all pass a ⅜-in. screen, then be broken on the No. 8 screen. For small pipe, at least 40 per cent should be retained on the No. 8 screen. The report continues by giving a more minute breakdown of sand and gravel sizes for smaller pipe, with particular emphasis on conditions applying in the state.

The advantages to be obtained by using a wet mix and a large tamping shoe are also discussed in detail. It is brought out that a small crusher installed at the site of concrete products manufacture can be used to advantage to add to the quantity of pea gravel, and can be adjusted to make any sizes particularly needed. The use of crushed rock as coarse aggregate builds a structure of wall which will slump less in stripping than that of ordinary gravel, and possibly gives a better crushing test strength.

Equipment care is mentioned, with wear causing dimensions greater than stated tolerances being brought out. A paragraph is also devoted to proper curing, with particular emphasis on proper temperature and amount of moisture. The control of aggregates in the manufacture of concrete masonry units does not differ greatly from control in the manufacture of small sewer pipe, for the same end result is sought and the same faults must be guarded against, according to the paper.

Concrete Products News

TIDEWATER CONCRETE BLOCK & PIPE Co. has received a charter to manufacture concrete products. James M. Hagood is president of the company. Capital stock is $100,000.

OSSEO CEMENT PRODUCTS Co., Osseo, Wis., is planning an addition to its plant which produced over 200,000 concrete block and 65 silos in 1946. John W. Norris is owner and Harley Elvestad is sales manager.

EVERGLADES CONCRETE PRODUCTS Co., Miami, Fla., has been incorporated with 100 shares of no par value. Incorporators are Verne Cheatham, Fred H. Small, and M. J. Small.

BUILDERS PRODUCTS Co., Three Forks, Mont., has started the production of pumice block.

UNITED CEMENT PRODUCTS Co., Wichita, Kans., has been organized to operate a concrete block, brick and tile plant. Authorized capital is $200,000. Resident agent is John P. Miller.

LAKE CITY CONCRETE PRODUCTS Co., Lake City, Minn., has erected a new building and is manufacturing concrete block. Capacity of the plant which is operated by Harlem Wiebusch and Norman Allers, is 1000 block per day.

NOEL READY-MIX CONCRETE Co., Spencer, Iowa, has been incorporated with a capital stock of $50,000. Officers of the company are Harry Noel, Jr., president, treasurer and secretary, and Joan Noel, vice-president.

W. B. CURETON AND DUDLEY CURETON are manufacturing concrete block in Trenton, Ga.

PRICE SMITH, who has a concrete block plant in Gould, Ark., has installed a plant in Dumas, Ark., to manufacture concrete block in a variety of colors.

BLUFFTON CEMENT BLOCK Co., INC., Kalida, Ohio, is manufacturing concrete block in a new plant which has a capacity of 15,000 block per 8-hour day, and expects to install another unit which will double the output.